

# THE IRON AGE

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## A New Design of Regenerator Chambers

### Arrangement of Passages and Location of Checker Brickwork to Give Accessibility for Cleaning and Efficiency in Operation

BY HERBERT F. MILLER, JR.\*

In articles on open hearth furnace operation one of the two major reasons given for the deterioration of the furnace, as its length of service increases, is the melting down or rather slagging of the checker brick together with the deposit of dirt in the form of iron oxide, etc., which helps to close the openings as well as slag the brick by chemical action. It is seen therefore that any construction which will do away with the necessity of having the waste gases come down through the checkers will eliminate the main cause of their deterioration. There are some other well defined causes which are subordinate to the main one given above.

Some of the defects of the usual regenerators are as follows:

1. The checkers cannot be cleaned while the furnace is in operation and neither can they be cleaned at the end of the run without taking out all of the checker brick. This results in a high labor and brick cost. The brick cost is high because the bricks are handled twice and bricks are spalled, rendering them useless, as a spalled brick will not hold together. The labor cost is high because all the bricks have to be handled twice.

2. The top courses of brick become coated with dirt and slag down. Large amounts of dirt are deposited throughout the checkers, especially at the bottom. The draft of the furnace is decreased by the closing of the top and bottom openings, and the entire working of the furnace is affected. If an effort is made to clean the checkers, the dirt and brick falling down into the holes help effectually in diminishing the draft still more.

3. The distribution of air and gases through the checkers is in many cases uneven, resulting in a lower temperature of preheated air and gas and therefore a slower working furnace. Also, the passage of air and waste gases is so crooked that the chimney is sometimes not powerful enough to overcome the friction and a very poor draft is the result.

The items mentioned are all important factors in decreasing the possible tonnage output of a furnace.

The ideal regenerator chambers have the following qualities to displace the defects:

1. The checker work must at all times be accessible in all parts so that the chamber can be either cleaned or repaired while the furnace is in operation.

2. The chamber must be of such shape that the checkers may be cleaned perfectly without removing a brick.

3. The checker work should be so placed that there will be a uniform distribution of air, gas or waste gases throughout the checkers and so there will be a minimum amount of dirt deposited on the checker brick nearer the hearth.

4. The bricks of the checker work should always be in such state that they need practically never to be removed.

These qualifications the writer believes would be fulfilled by regenerator chambers built according to the accompanying design, the explanation of which is as follows: The chamber forms an enlarged portion of the flue proper extending in almost a straight line from the downtake to the chimney. The checker work is built on the floor and occupies the central portion of the chamber with a distribution space at each end as wide as the chamber for a

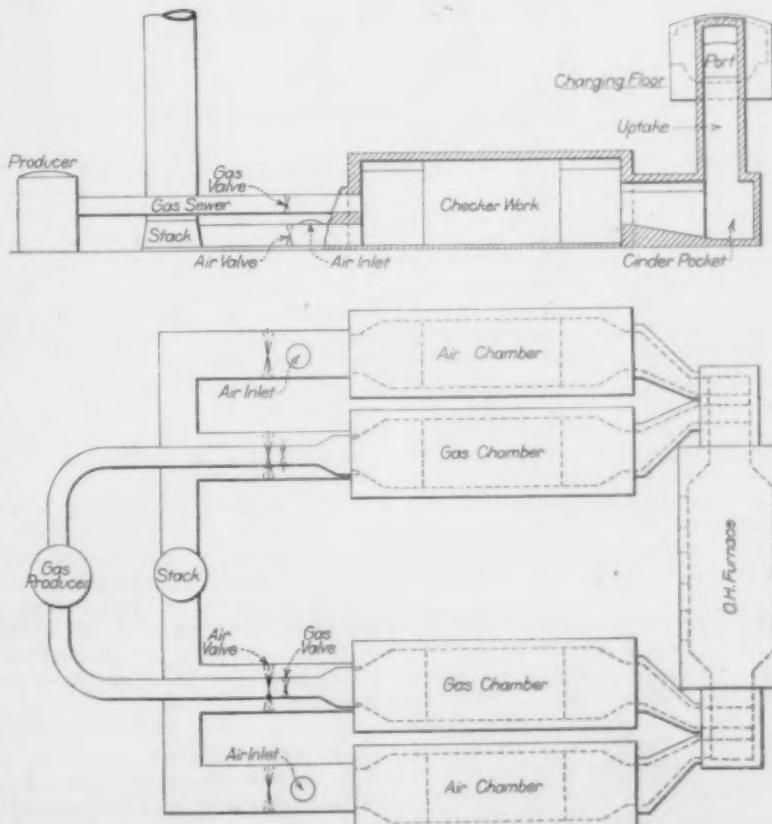


Fig. 1—Plan and Elevation to Show Regenerator Chambers of Furnace

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few feet and then converging at an easy angle to the passage way at each end of the chamber. The expensive tiles, large checker brick, and unstable rider walls are done away with and the checkers are built up in a manner much more stable than the current practice, as all brick ends rest on other bricks. The fact that the checkers will not have to be removed would permit the use of the efficient 9-in. straight porous silica brick. Nine-inch straight bricks give more heating surface than do the large checker bricks. The percentage of passage in the entire cross-section of the checker work can be regulated by the size of the brick used and by the method of laying the brick. This is indicated in Fig. 2.

The distribution space plays an important part in the life and working of the checkers. The waste gases going out reach this wide distribution space, slow up, the suspended dirt is deposited on the floor and the gases spread over the entire cross-section of the checker work. This even supply of air or gases over the entire cross-section is natural, because a gaseous body when admitted to a larger space fills it and also there is no tendency to draw through any one portion of the checker work. The flue at the other end of the chamber is so far from the checker work that it is impossible for it to favor any particular section of the checkers.

The dirt that is deposited on the floor may be scraped out at any time through seals at either side of the distribution space at both ends of the chamber. The waste

of the checkers is at a constant high temperature, leaving the top and bottom to fluctuate in temperature, we would then have a flame that would be hot throughout the melt. This factor would in turn affect the gas consumption, as the gas would have to be shut off gradually and continuously as the furnace got hotter. This means that we would be using for the most part and at the time of most danger, a short, intensely hot flame which would be easily controlled. The practice that is sometimes in use of running the gas through the furnace and down the checkers in order to overcome the tendency of the checkers to cool off, resulting in an unnecessary amount of gas being used, is not needed to make fast time, as the checkers will remain hot.

The large amount of excavation necessary in constructing the present type of checkers will not be necessary as the checkers will obtain their heating surface in the horizontal rather than by vertical lines. This quality will permit the waste gases to give heat through a much longer distance than is now possible and in doing so will make a more efficient furnace. In plants where excavation is attended with great difficulty, because of encountering water, this new type of regenerator should be welcome, as there is no need of much excavation in building them.

The gas flue from the gas producer is entirely separate from the flue to the stack and is accessible at all times, permitting a very simple arrangement of valves. In addition, by closing the stack damper of the gas chamber, the

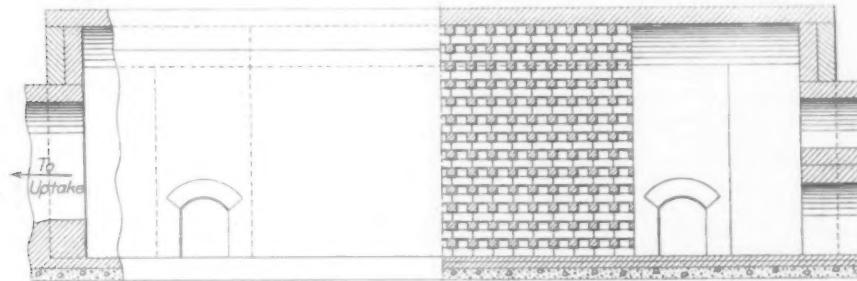


Fig. 2—Sectional Elevation Through Gas Chamber

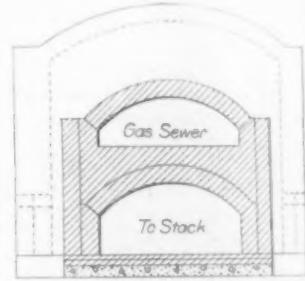


Fig. 3—Section of Gas Passages

gases go through the checkers with very little further deposit of dirt. If the checkers need cleaning on Saturdays after the last heat is out, the gas may be put on the end to be cleaned and in a short time the temperature of the end of the chamber nearer the air inlet will be low enough for a man to enter and clean the checkers with compressed air or steam. The gas checkers are cleaned the same way, except that the gas is of course shut off and the manhole opened to supply air.

The air chamber is not shown, but it differs from the gas chamber in that it has no gas sewer and the air flue is raised above the floor of the chamber a proper distance. This will counteract any tendency for the cold air to travel along the bottom of the chamber, an action which is reinforced by the natural expansion of gases entering a larger space, especially when heat is supplied to the gas.

The furnace will be more efficient because the regenerator checkers will all be used, whereas in the present type a large portion of the checkers are dead and worthless for the purpose for which they were intended. The present type of checkers cannot have a uniform distribution of the gases, as anyone can see if the design is studied, for one-half of the checkers lies below the diagonal line of draft and, further, the face of the checkers is parallel to natural flow of the gases instead of being perpendicular to it. Also by having more checkers, all of which are in active use, the furnace will be burning gas efficiently throughout the melt. By that I mean to say that when a furnace is charging up and while it is melting down cold stock, the waste gases are so cold that the checkers are cooling off and the flame temperature gets lower and lower until the stock begins to attain a melting temperature and the waste gases then begin to go off at a higher temperature. Then the temperature of the checkers begins to rise and the flame temperature gets higher as the tapping time of the heat draws near.

Now if we can get the checkers in our chambers so arranged and have enough of them so that the main body

entire gas flue to the gas producer may be burned out quickly with hot air by using compressed air as an aspirator.

The wet slag will, of course, be deposited as usual in the cinder pocket. It is readily seen that under these conditions the checkers will last indefinitely with very few renewals of brick and no renewal or removal of the entire checkers at the end of the run at all.

Summing up we have at our disposal a regenerator that:

1. Is built along much simpler and more rational lines than the present type.
2. Is capable of furnishing a heating surface limited only by the distance from the furnace to the stack.
3. Gives easier lines for the travel of gases, together with a complete and efficient distribution of the gases throughout the entire checker work. This is very important in producer gas work where the travel of gas should be along as straight and easy lines as possible. Through the efficient distribution, the producer gas and air will be much hotter if desired.
4. It does away with all unstable tiles and rider walls and all expensive brick.
5. Is accessible at all times for repairs or cleaning without interfering with furnace operation.
6. It gives a simpler arrangement of valves and flues.
7. Permits an easy and quick means of cleaning the gas sewer in producer gas practice.
8. It does away with the slowing down of the furnace because of dirty checkers.
9. It does away with the need of removing the checker brick at the end of the run.
10. It furnishes a type of regenerator chamber that will last indefinitely before any considerable number of checker brick will have to be renewed.
11. The final result, all other things being equal, is an increased tonnage, a longer run and faster time made in producing the steel.

# The Production of Sound Steel Ingots

Crucible Steel Ingots of Simonds Mfg.  
Company Freed from Pipe and Segregation  
by Compression When Fresh From Molds

BY LESLIE E. HOWARD\*

There is probably no manufactured article made of steel in which the production of absolutely pipeless and sound ingots is of more importance than that of saws, and especially that line known as mill saws, this comprising the very large band saws in use to-day as well as the large circulars and the auxiliary saws in general use.

Some seven years ago experiments were commenced by the Simonds Mfg. Company of Fitchburg, Mass., at its Chicago plant, aiming to develop a method for the production of sound ingots especially for the manufacture of saws, and the method and apparatus briefly described is the outcome of this long series of experiments. When it was first suggested that the ingots commonly used in crucible steel mills be made sound by fluid compression, it was felt that it would not be practical to develop a method and apparatus that would handle the very small ingots which it would be necessary to operate on, and it

It was found early in the series of experiments above referred to that it was quite out of the question to compress ingots in the same molds in which they had been poured, chiefly for the reason that the mold cost and upkeep was too great to make the proposition a commercial one. It was found that an ingot of approximately square cross section could be operated on more satisfactorily than any other cross section (excepting round or octagon), although ingots have been made satisfactorily by the process with a cross section 4 x 8 in. and 8 x 12 in. and weighing respectively 350 and 600 lb.

Another feature which our first investigations revealed was the fact that practically all attempts to compress ingots by lateral pressure previous to the method outlined here had been along the lines of placing a large number of molds tandem style in one pressing unit, and investigation as to the effect of this arrangement showed conclu-

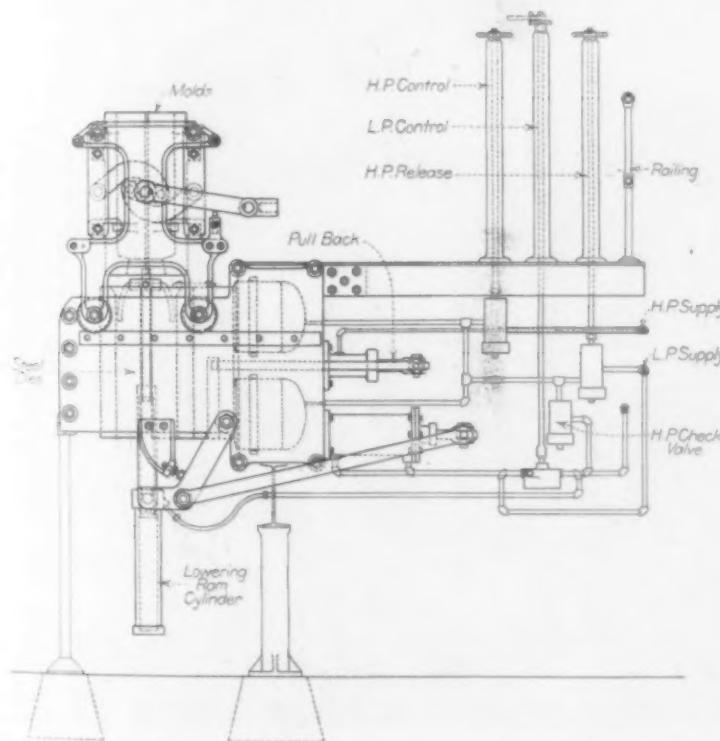


Fig. 1—Elevation of Ingot Press Located Immediately Below the Mold

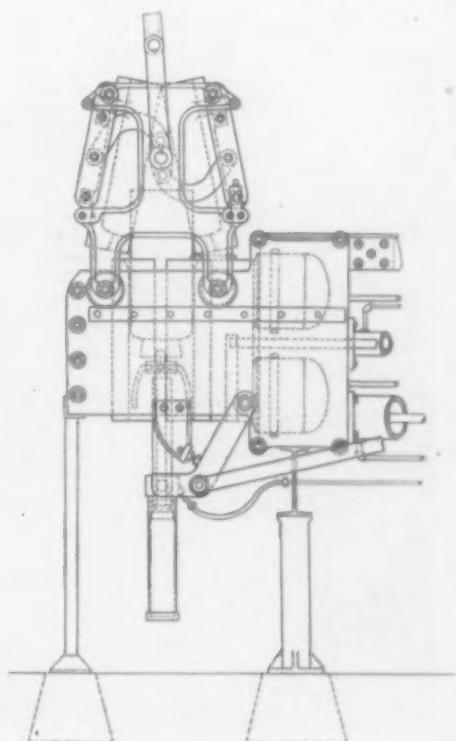


Fig. 2—The Fresh Ingot Being Lowered Into the Press

was found by investigation that practically no plants were in operation working on ingots of much less than a ton weight.

Having this in mind, the first experiments along the lines of method and pressing apparatus were on small experimental ingots weighing but 15 lb. each, and it was found that there was no difficulty whatever in producing these absolutely sound and without blowholes or pipes. The next step was on slightly heavier ingots, weighing around 110 lb. and of rectangular cross section 3½ x 5½ in. A pressing unit was then built capable of handling one 400 lb. ingot or two 200 lb. ingots at each heat and, with modifications from time to time, this arrangement has been found very satisfactory and at the present time, at the steel plant of the Simonds Mfg. Company at Lockport, N. Y., eight presses are in continuous operation, making ingots ranging from 180 lb. up to and including 600 lb. in weight.

sively that there is practically only one ingot in the series that could possibly receive proper treatment. Aside from this, most of the apparatus of this nature was rather cumbersome and expensive to operate and the press had to be practically dismantled to get the ingots out after they had been operated on. It was, therefore, considered desirable to set to work on the lines of producing an apparatus possessing the following general features:

1.—Have the units small and extremely simple so that if one unit was out of order for any reason, it would not in any way affect the rest of the plant.

2.—Design these units so that the plant could be added to and the system extended at will and, at the same time, have each unit entirely separate and independent of the others so that it could readily be lifted out of its place with a crane if out of order or damaged and a spare unit put in its place. So far it has never been found necessary to do this, but it was considered desirable to have this in mind in developing this method.

3.—Be able to operate on the ingots in such a way that

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every individual ingot receives precisely the amount of pressure and time necessary to get the best results without reference to any of the other ingots being cast at the same time.

4.—Develop a mechanism that would be so extremely simple and rugged that it would not require a different type of labor to operate than is commonly found in melting shops.

In addition to the above considerations, it is, of course, obvious that a plant of this nature to be commercially successful must not involve a large investment as compared with the returns, and that the operating costs must be extremely low.

#### The Ingot Casting and Compressing Plant

In a general way, the method consists of casting the ingots in molds made of special cast iron and, while the

noticed in this view that press No. 1 in the foreground is equipped with two molds, whereas the rest of the presses are each equipped with one large mold. A full equipment of both molds and dies are provided, however, for working all of the presses simultaneously on either size of ingot. Other odd sizes are provided for one or two presses where the small tonnage does not warrant equipping eight presses with the special molds and dies.

In ingots up to the sizes mentioned above and also up to and including 3000 lb., split molds are found satisfactory and desirable, as they greatly facilitate the stripping operation and on account of the very short time which the ingots are in the molds, there is an entire absence of warping and distorting of the molds commonly met with in split molds where the ingot is allowed to cool entirely in the molds to a point where it usually is stripped. Molds are in operation in Lockport at the present time which have

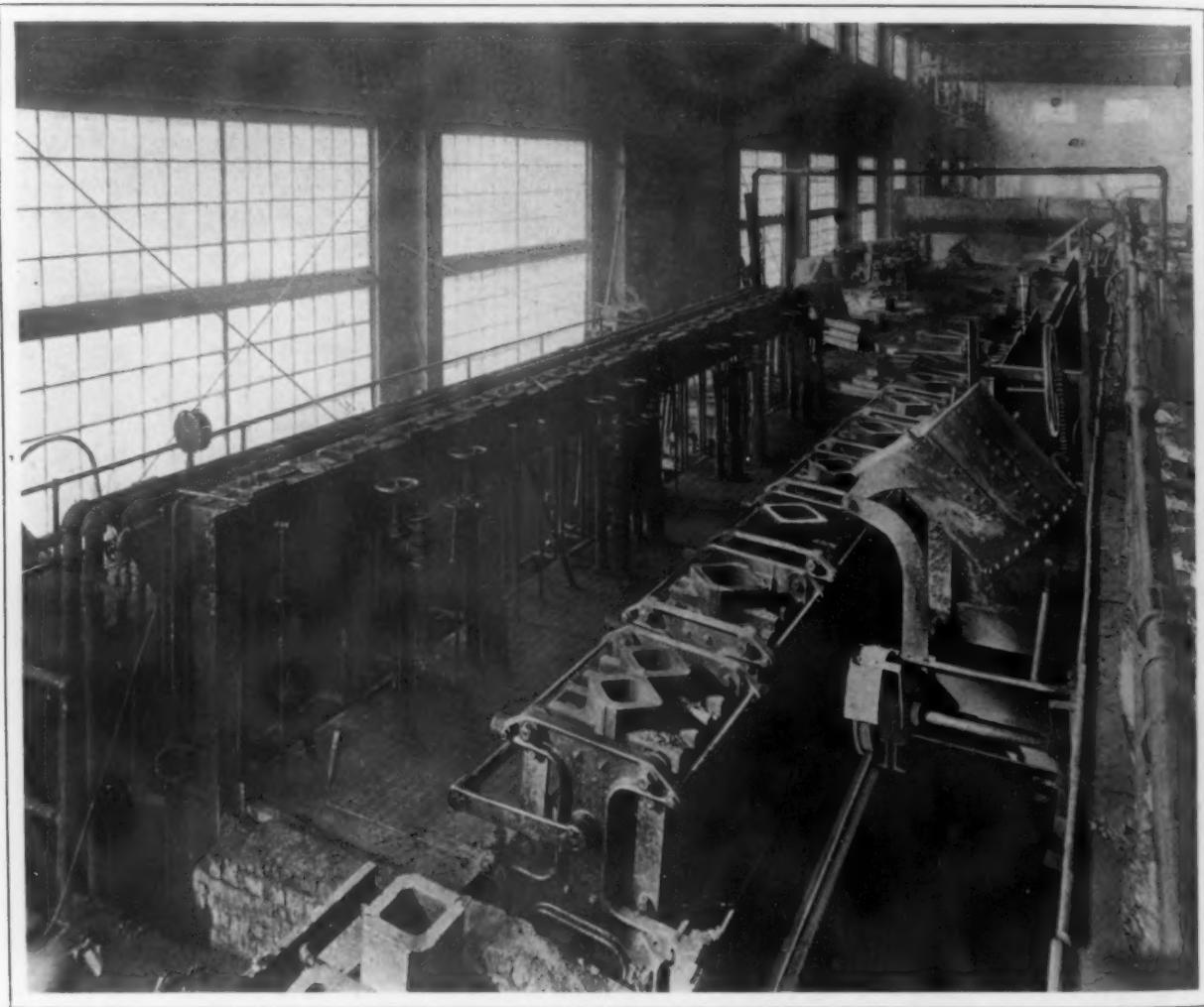


Fig. 3—Row of Ingot Molds, the Working Platform and the Valve Control Stands

ingots are still internally fluid but sufficiently set so that they will not burst by careful handling, they are transferred mechanically to steel compression dies where they receive lateral or side compression of from  $1\frac{1}{2}$  to 3 tons per square inch of greatest area of cross section operated on, this pressure depending largely on the composition of the steel, temperature of the steel when poured, etc.

The line drawing, Fig. 1, shows the general arrangement of presses for handling ingots up to  $1\frac{1}{2}$  or 2 tons and as small as may be desired, and as many of these presses as are necessary for a given output are arranged side by side, supported in any suitable way, dependent on local conditions. An extension of the back end of the press serves as a support for a working platform which is made continuous from press to press, this working platform on the smaller size presses being approximately 3 ft. wide and the length of course varying with the number of presses making up the installation. This is shown quite plainly in Fig. 3, which also gives a good idea of the valve control stands and the ingot racks. It will be

been running eight months night and day and are just beginning to show slight cracks in the side walls of the molds and which are good for another six weeks or two months.

It will be noted by referring to Fig. 1 that the press proper is of a box-like form or design, this being found desirable on account of the great strength for the total weight of the completed press and for the low cost of machining, aside from making it very rugged and not easily damaged by rough handling. The hydraulic compressing cylinders form one end of the "box" and a heavy steel casting forms the other end, these two members being tied together by cast steel side stress members, interlocking joints being provided, so that the greater the strain between the back head and the rams the more closely do the side members pull in on the cylinders and back head. The tie rods holding all of the press members together have, therefore, only to keep the members in place when there is no load on the rams or when handling the units.

A simple retracting arrangement for the cross head and hydraulic rams is provided which, in the case of the smaller

size units, is usually a spiral spring and which, in the larger sizes is a hydraulic cylinder of very small cross section relative to the cross section of the pressing cylinders and which is piped to the high pressure supply without any provision being made for valves or control.

The mechanism for lowering the partly cooled ingots from the molds into the compressing dies consists of a hydraulic cylinder and ram carried on two swinging arms (one on each side of the press), so that it may be brought out of vertical alignment with the dies when desired and leave the pit under the dies absolutely clear and unobstructed. The mechanism for accomplishing this result consists of a small low-pressure cylinder usually mounted on the back end of the press and provided with a simple cross arm and connecting rod arrangement controlling the movement of the swinging arms carrying the lowering ram cylinder noted above. The controlling valves and mechan-

section have been found to work out better not only from the compression standpoint but also for subsequent operations in the mills.

The bottom of the split mold referred to is formed partly by a removable round taper block carried on the lowering ram and so arranged that when the molds are "set up" this lowering ram is in its uppermost position and the taper block forms a bottom closure to prevent steel from running through the bottom of the mold. It is found that these blocks or mold bottoms take practically all the wear of the mold, such as the cutting effect of the stream of molten steel when pouring, and they are practically the only parts that have to be renewed under seven or eight months, and these ordinarily last when running night and day on one 30-pot furnace from two to three months. The regular procedure or operation on ingots with this apparatus is briefly outlined in the following:

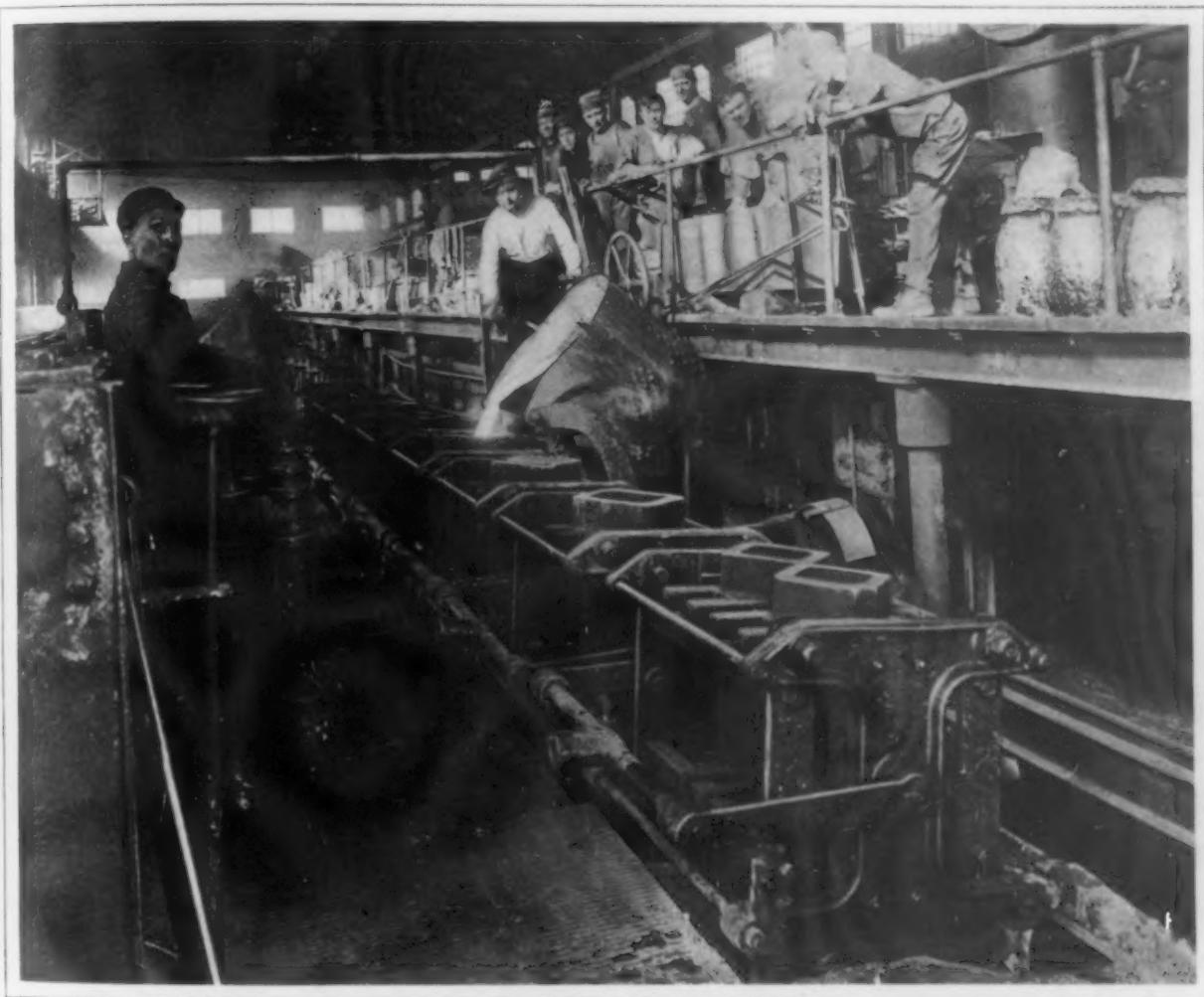


Fig. 4—Mold Racks at Lockport Plant of Simmonds Mfg. Company, Showing a Recent Method of Pouring

ism are extremely simple, all of the movements of the ingot after it leaves the mold being accomplished by one low pressure controlling valve, the handle of which, being moved from notch to notch, causes each of the parts to function properly and in their proper order. The high-pressure cylinders are controlled by a simple form of stop valve and a simple one-way valve for discharge.

Mounted above the compressing dies is a mold carrying rack which needs very little explanation, as the drawing, Fig. 1, shows quite clearly the principle on which this works. The molds shown here are split molds and in the smaller sizes this mold-carrying rack is operated by hand and in the larger sizes by a small hydraulic cylinder mounted on the side of the press frame and which is not shown in this drawing. Ingots of various cross sections have been operated on by the regular equipment, but the present molds and dies are designed and built for pressing the ingots cornerwise; that is, with one of their cross section diagonals at right angles and the other normal to the direction of compressing, and ingots of square cross

#### Method of Operation of the Plant

The molds (having been previously well smoked without removing from the racks) are locked together by the toggle arrangement shown in the drawings and the lowering plunger is brought to its uppermost position, so that the bottom of the mold is closed by the taper block referred to. The controlling valve on the high-pressure cylinder is, of course, closed and the discharge valve open and the dies are thus opened to a pre-determined point.

The molds are now poured by any approved pouring device, but at the plant described by a top-poured hydraulically operated, shown in the halftone, Fig. 4, and after pouring the ingots are allowed to set a pre-determined length of time, depending on the size of the ingot, composition of steel, etc., but in any event just as short a time as is necessary to form a light skin which will not burst open when the ingots are stripped. This time varies from one to five minutes on ingots from 150 to 600 lb. in weight and of various composition.

The stripping mechanism is now operated so that the molds occupy the position shown in Fig. 2 (which shows the ingot partly descended into the dies), leaving the ingot supported at the top end by the molds (which are not opened much if any at their top ends) and by the tapered block at the bottom end, which forms the bottom closure of the mold during the pouring.

The low-pressure controlling valve handle is now moved one notch, causing the ingot to descend into the compressing dies, the speed of this descent being controlled by a stop cock in the discharge line. The lowering cylinder is provided at its lower end with a spring or in some cases with a hydraulic stop so that the ingots are brought to rest very gently and in a position suitable for the pressing dies to operate on them.

The high-pressure release valve is now closed and the low-pressure controlling valve handle is moved to the next notch and low-pressure water is thus caused to flow from the low-pressure supply through a high-pressure check valve into the high-pressure compressing cylinders and the compressing dies are thus rapidly moved up to and in contact with the ingots and the cylinders filled with water under low pressure, usually 100 to 125 lb.

#### Squeezing Out the Liquated Segregations

The high-pressure controlling valve is then opened very slightly and compression is commenced. At this point, the ingots are still fluid internally and have not begun to show the slightest sign of pipe or sinking in the top end. The compressing cylinders are allowed to come up very slowly indeed, so as to just keep the ingots from forming pipe, and this is continued until by experience it is known that the ingot is very near the point of setting or becoming solid throughout, when the pressure is increased slightly and a small amount of the last portion of the ingot to cool is squeezed out of the top, this, of course, being the liquated portion mentioned by A. Capron in his very able paper before the British Iron and Steel Institute of 1906, and, as pointed out by Mr. Capron and others, this liquated portion contains practically all the segregation and is decidedly higher in phosphorus, sulphur and other impurities. This liquated portion forms a rough ball-like knob on the top end of the ingot and is practically the only portion of the ingot not suitable for finishing and in weight varies from  $2\frac{1}{2}$  to 4 per cent. of the total weight of the ingot. This squeezed-out knob is shown in Fig. 5.

As soon as the compressing dies have a good grip on the ingots so that there is no possible danger of their dropping through into the pit, the low-pressure controlling valve handle is moved to the fourth notch, causing the low-pressure cylinder to move the ingot lowering cylinder out of vertical alignment with the compressing dies and the controlling valve is then left in this position until compression is completed. The pressure is kept on the ingot for a considerable time after it has ceased to "rise"; in fact, after it has reached the point where it is considered solid, the pressure is quite materially increased and the ingots then receive what is virtually a hydraulic forging treatment which tends to break up the coarse crystals formed in cooling into a fine crystalline structure much resembling an ingot worked under a hammer or forging press.

When the operation of compressing is completed, the high-pressure control valve is closed and the discharge valve opened, when the dies immediately retract and the ingot drops through into the pit, and this may be provided either with a bottom of sand so that the ingot may be

given a partial annealing before going to the stock piles, or the ingot may be dropped upon cars or a conveyor.

#### The Practicability of the Plant

The resulting ingots have the appearance shown in Fig. 5, this being from a 400-lb. ingot split longitudinally, while Fig. 6 is an ingot poured at the same time weighing slightly less on account of its decreased length and not compressed. There is no dismantling of the presses to discharge the ingots and the operation of setting up ready for another heat takes but a few minutes. In fact, the first of the presses to be poured are quite often set up; that is, the molds are locked together and the low-pressure valve handle moved to the first notch of its quadrant, thus causing the lowering ram to rise to its uppermost position and the taper block which it carries to close the bottom of the mold, before the last of the series have dropped their ingots. The total operation of setting up eight presses occupies but 10 or 12 min., the greater part of which is used in smoking the molds.

One man easily operates eight presses and the presses are so designed that they may take care of 2 to 3 furnaces (in the plant being described these being 30-pot crucible furnaces), providing all the furnaces are running on the same size of ingots so that it is not necessary to change the molds and dies between the heats, as the presses are amply provided with cooling facilities so that the parts do not become overheated.

It is quite obvious that with the hot ingots in contact with the mold walls only about one-twentieth of the time usual when they are allowed to cool in the molds, the molds do not get overheated and no artificial cooling of any kind has been found necessary. The cross head and, on large presses, the compression dies are provided with water cooling, and the high-pressure cylinders are also piped so that when they are not under actual load, low-pressure cooling water may be circulated through them, thus keeping the rams and packing leathers at a reasonable temperature. There has been no trouble whatever experienced with packing leathers, all of these having on an average run ten months night and day without renewal.

The pressing dies, as mentioned early in these notes, are of cast steel and in the equipment described there are two grades, that is, one-half of the dies are of 0.40 per cent. carbon, and the remainder 0.70 per cent. carbon steel

castings, but up to the present time there is no appreciable difference in their performance, as all of the dies show practically no signs of wear and should last at least one year without replanning, and as the design has made allowance for at least seven or eight replanings, they should last four or five years without renewal.

One point of special advantage in changing from one size ingot to another is the fact that there are absolutely no fastenings of any kind holding the molds or dies to the other mechanism, excepting that the molds are provided with loose links which drop over one of the cross bars in the mold rack and can be readily lifted out by hand or by using a pair of tongs. The molds are usually lifted out of the rack with the crane in pairs, special hooks being provided for this, and it is no more trouble to lift them out or in the mold racks than lifting them up from one position on the mill floor and setting them down in another. The compression dies are simply lifted in or out of the press frames and gravity alone keeps them in place. The retraction of the movable dies is accomplished by a loose fitting link, one end of which engages a pin in the top end of the movable die and the other end a pin in the



Fig. 5

Fig. 6

Ingots of About 400 Lb. Weight Split Longitudinally, the One at the Left Compressed, Showing the Liquated Portion Squeezed Out at Top

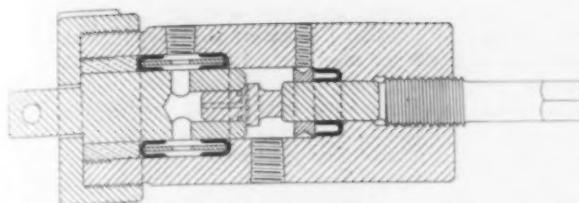


Fig. 7—Design of the Hydraulic Valves

top end of the cross head, and this is readily lifted off and on with tongs or by hand.

The plant at Lockport is served by a single-acting triplex high-pressure pump with  $1\frac{1}{4}$ -in. rams and 8-in. stroke and driven by a 15-hp. motor, and the low-pressure supply is obtained by a  $3\frac{1}{2} \times 4$ -in. triplex single-acting pump running at 100-lb. pressure and driven by a 3-hp. motor. As these pumps are only run about one-half hour at each heat, it is obvious that the power consumption is extremely low. Both pumps have a common supply tank and, of course, the discharge from the cylinders is piped back to this tank. This portion of the plant was so designed that, if found desirable, during the extreme cold weather incurred at Lockport, a solution of alcohol and water could be used to guard against freezing, but so far this has not been found necessary as the radiated heat from the adjacent furnaces has been sufficient to obviate any trouble from freezing.

It may be said in passing that all of the hydraulic valves on the high-pressure side of this system are designed on the lines shown in Fig. 7, so that the valve and valve seats can be removed very readily for repairs without breaking any pipe connections. The time for making a change on any of these valves practically never exceeds 30 sec., and on a test has been done in 9 sec., and as the parts are extremely simple to machine, this is one of the least of the troubles in the every day operation of this plant. It has been found desirable also to equip the hydraulic pump which operates at 4500-lb. pressure with valves of this general type, so that there is never any shutdown or stoppage on account of leaky valves.

#### The Interesting Tests to Prove Results

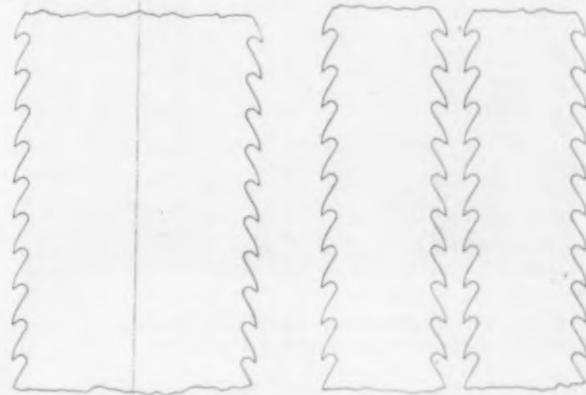
Some of the results obtained from the use of this method are extremely interesting. Probably one of the most severe tests which could have been made was in the manufacture of shingle saws, which, as is well known, run in sizes from 36 to 42 in. in diameter, and while they are 9 to 7 gauge thick at the centre (where they are ground "straight" for a collar or reinforcing plate), they taper from that collar to the rim until they are only 14 or 16 gauge at the rim or cutting edge. These saws are left just as high temper as possible to file them properly in fitting and, at the same time, nearly all of them are "full swaged," as shown in Fig. 8, thus imposing a very severe test on the material even when the steel is absolutely sound and normal. While going through some tests on special steels, it was decided to determine how close these saws might be taken from the top of an ingot and still stand the severe swaging tests. The results were very satisfactory indeed, and several ingots were cut in such a way that one side of one saw from each ingot was only  $\frac{3}{8}$  in. from the normal top line of the ingot. Every one of these went through perfectly sound and were looked over by several inspectors who could not, by any test, determine which saw came from the top of the ingot and which from the bottom. Later, field tests on these saws indicated that there was no difference whatever in the quality of the saws, whether it were made from the top or bottom portion of the ingot.

Another test which indicates the absolute soundness of the ingots made by this process was made on large

band saws. Fig. 9 shows what is known as a double-cut band saw, that is, a band saw having teeth on both edges and these also are full swaged, as shown in Fig. 8. These saws range in size from 6 in. of 16 gauge up to as large as 18 in. of 11 gauge and it is quite apparent that any unsoundness of any kind would render the saw worthless. Several 12-in. saws were taken at random from our Chicago stock and split lengthwise from end to end and the "inside" edges toothed, when they presented the appearance shown in Fig. 10. These were then swaged so that each tooth presented the appearance shown in Fig. 8, and there was not a single indication of split or pipe anywhere in any of the saws, proving conclusively that the steel must have been sound and free from pipes and blowholes from top to bottom of the ingot, as these band saws are cut very close to the top of the ingot at the present time.

Several ingots were cut open longitudinally and the exposed surfaces planed and polished and a careful study of the structure made; and so far as these tests have gone, they show that the ingots were homogeneous and with an entire absence of segregation up to ingots of 600 lb. in weight and that the structure of the steel as it leaves the compressing dies is absolutely uniform. Test pieces cut from these ingots without any work of any kind being done on them have shown that steel taken from the top centre of the ingot where the pipe usually forms gives precisely the same physical tests as test pieces cut from other portions of the ingot, while in uncompressed ingots the centre of the ingot even in the lower half and bottom end does not test out nearly as well as pieces cut from the sides.

In a general way, the method is not intended to be a curative one, as tests made in our early experiments proved to us conclusively that if a pipe in an ingot had once developed and sulphides and oxides formed on the



The Double Cut Band Saw of Fig. 9 Was Split Lengthwise and Toothed as in Fig. 10 to Test for Soundness of Steel

surface of the cavity, it was practically impossible to weld it up or cure it in any way, but the method is preventive and most effectively prevents a pipe forming. Various grades of steel have been operated on that may be made in a crucible or electric furnace, but practically all of the tonnage so far handled is tool steel used in the manufacture of saws and machine knives, this including straight carbon steels of the usual carbon content for the purpose noted, as well as low alloy steels. It has been found, however, that in the case of strictly high-speed and semi-high speed steels, the apparatus must be handled very carefully and the ingots at once annealed after pressing, this owing to the increased density of the already very dense material, due to compression. Great care must also be taken in re-heating ingots of this type that the heat is brought up slowly and uniformly to prevent the ingots bursting.

The plant as described above has been working night and day for something over a year and at the present time all of the band saw and circular saw steel, excepting the very small circulars, are made from compressed material, and equipment is now in process of construction which will enable the Simonds Mfg. Company to compress every pound of steel made in Lockport.

It has been found that the total cost of operating this plant is less than 3 per cent. of the value of ingots operated on and this will be reduced somewhat when the new

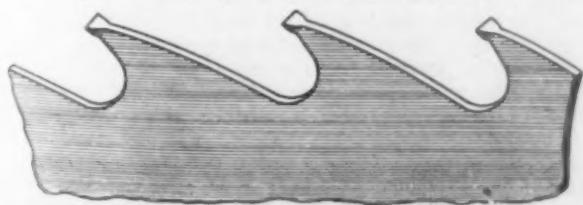


Fig. 8—The Swaging Given to the Saws, Indicating the Necessity of Sound Steel

equipment is completed, as a greater tonnage of ingots will be handled with no increase in labor cost and a decrease in capital charge, for the reason that interest and depreciation is now taken at 15 per cent. on not only the total cost of the plant as a going proposition, but also on all of the experimental work and expense up to date.

Experiments are also under way for a modification of the device to be used especially on large ingots in which the split molds are replaced by the usual form of solid tapered mold handled by an ingot stripper of the usual design. The process and apparatus is fully covered by patents Nos. 922,587 and 926,489 of 1909 and 1,056,101 of 1913, as well as patents in foreign countries, all granted to the author and assigned to the Simonds Mfg. Company.

### Heat Treating Furnace for Oil or Gas

In the plant of the Duff Mfg. Company, which was described in *The Iron Age*, April 10, 1913, there have been installed a number of double-chambered heating furnaces capable of burning either natural gas or oil as fuel. These furnaces, which were installed by Tate-Jones & Co., Inc., Empire Building, Pittsburgh, Pa., are arranged so that each chamber can be operated independently of the other and either fuel can be supplied to the burners instantly.



A Double Chamber Heat Treating Furnace Capable of Burning Either Natural Gas or Oil as Fuel

The only change necessary in the furnace in swinging over from one fuel to the other is to turn off the oil and to turn on the gas or vice versa.

There is no stack required for the furnace, and the venting and superheating flues are arranged to secure all the heat possible from the fuel before it is allowed to escape. The arrangement of the burners and the combustion chambers on the side of the heating chambers aims at obtaining even heating all over the working chamber, which is 4½ ft. wide and 6 ft. deep. The temperature of the furnace is observed by Bristol pyrometers. The door openings to the heating chamber are 42 in. wide, and when the doors are lowered they are held tight against the front of the furnace by door checks which strike the tapered lugs on the doors.

Among the various classes of work handled by this furnace are large semi-circular and straight racks and pawls. When the latter are being treated it is the practice of the company to empty one chamber and refill it while the other is heating up.

The furnace was designed to burn either natural gas or oil, so that in heavy winters when the supply of natural gas becomes short or it is necessary to cut manufacturing plants off entirely, the auxiliary oil system may be used to guard against a shutdown due to lack of fuel. The burner used on the furnaces is of the builder's standard combination type, having four connections. The natural gas supply enters at the top, the supply pipe running horizontally just above the top of the furnace. The air blast for combustion, which is supplied at a pressure of 4 to 6 oz., is furnished by an overhead blower, discharging into

the two diagonal pipes to the burners on each side. The air pressure is regulated between the limits given by a butterfly damper in the vertical pipe running to each burner, the handle controlling this damper being shown about midway between the burner and the air pipe. At the time the photograph here reproduced was taken only the gas and air connections had been made to the burners. The oil supply and the compressed air or steam for atomizing this liquid fuel enter on opposite sides of the T shown on the horizontal pipe projecting from the middle of the burner.

### Mexican Conditions Not Yet Normal

Victor M. Braschi has arrived in New York from Mexico City, Mexico, where he represents several American manufacturers, including the John A. Roebling's Sons Company, Trenton, N. J.; Denver Engineering Works Company, Denver, Col.; the Aldrich Pump Department of the Allentown Rolling Mill, Allentown, Pa.; the Ingersoll-Rand Company, New York, and the A. S. Cameron Steam Pump Company, New York. Mr. Braschi, who will be at the Hotel Collingwood for about two weeks, says that railroad communication with the United States is still disturbed in the northern part of Mexico, where the Government has been hampered by the secession movement and that conditions necessitate detours in traveling. In the southern part also there is disaffection and that section is practically cut off. He cites as one of the chief troubles the delay in mails, all such matter from the United States now being carried by weekly steamers by way of Vera Cruz.

From the central part of the country, where Mr. Braschi is located, he has been able to carry on business with such points as he can reach. He estimates that general business has declined from 25 to 50 per cent. in that part of the country since the revolution, while in the north and south business has been almost at a standstill. Nearly everything Mexico produces, including copper, petroleum and coffee, is now commanding a good price and all that is needed to make for prosperity is a stable government in full control of every province. A good feeling exists toward the United States, he says, as it is recognized that this country has acted in a neighborly and honorable manner toward Mexico.

### Buffalo Sales Offices in New Locations

On May 1 quite a number of the offices of sales agencies of iron and steel manufacturers represented in Buffalo will be moved to the new 18-story Marine National Bank Building at Main, Seneca and Washington streets. Among the companies whose Buffalo office locations will thus be changed are the following:

American Bridge Company, F. D. Rideout, contracting manager, will remove from the Ellicott Square Building and occupy offices 1302 and 1304.

American Sheet & Tin Plate Company, C. W. Morrow, agent, will occupy room 1306.

Carnegie Steel Company, Fred. C. Deming, manager of sales, will occupy the suite Nos. 1308 to 1318.

Lackawanna Steel Company will occupy a suite on the ninth floor, where, in addition to the offices of G. A. Hagar, sales manager, will be located the city office of C. H. McCullough, Jr., vice-president and general manager of the company.

Miles Brothers, San Francisco, have placed an automatic moving picture camera on the roof of the Service Building of the Panama-Pacific International Exposition, for the purpose of recording the constructing of the Machinery Palace, the largest building of its kind ever erected on the Pacific coast. The camera will take a set of pictures every five minutes, showing the advance in the building operations. The record will show 96 sets of pictures for each working day. The camera is operated with a delicate mechanical device which takes the picture at unvarying intervals. When the building is completed these pictures will be developed and when shown the spectator will watch the structure completed without the tap of a hammer and in an incredibly short time.

## Pig Iron from Electric Furnaces

### Steady Progress at Scandinavian Works—Recent Results at the California Plant

A survey of the progress in the manufacture of electric furnace pig iron is given by B. Neumann in *Stahl und Eisen* for March 20, 1913. He says that up to the present time the most successful process for the production of pig iron in an electric furnace is that controlled by the Elektrometall-Aktiebolaget in Ludvika. Details have been published of the operation of the first large experimental furnace in Domnarfvet, as well as of the half year's operation—November 16, 1910, to April 9, 1911—of the large 2500-hp. furnace at Trollhättan, and also concerning a further half year's operation—August 4, 1911 to March 6, 1912—of the same furnace after a few changes in construction.

never rested because every few days there was a change in the ore. The operating figures from October 1, 1912, to December 31, 1912, are shown in Table 3.

To make these figures of more value the author has contrasted them with the average figures of former operations in Table 1.

Table 2 shows that success has been achieved in loading the furnace with constantly increasing current, but the consumption per ton of pig iron has steadily lessened. The amount, about 2000 kw. hr., is quite satisfactory. There have been instances of a smaller consumption of electricity, but only in short experiments. This is also true of the charcoal consumption. The lessened percentage of idle time shows that the entire construction is adapted to effective operations on a large scale. It is considered unlikely, moreover, that important changes in construction will be necessary.

TABLE 1.—*Operating Yield of the Electric Furnace at Trollhättan*

Furnace	Operating period	Average burden in kw.	1 kw. year, iron produced in tons	NECESSARY FOR 1 TON PIG IRON		ELECTRODE CONSUMPTION FOR 1 TON PIG IRON		Operat- time hr.	Time idle, hr.	Per cent. idle
				Kw.-hr.	Charcoal, kg.	Burned away, kg.	Total con- sumption, kg.			
1. Domnarfvet.....	May 5, 1909, to Aug. 31, 1909.	500	2.76	3181	354.1	8.0	30.0	1903½	112½	5.9
2. Trollhättan.....	Nov. 16, 1910, to Apr. 9, 1911.	1344	3.66	2391	418.0	4.9	9.7	3348½	153½	4.3
3. Trollhättan.....	Aug. 4, 1911, to Mar. 6, 1912.	1482	3.93	2225	404.8	5.2	5.7	4825½	345½	6.7
4. Trollhättan.....	Oct. 1, 1912, to Dec. 31, 1912.	1833	4.22	2076	397.6	2.8	2.8	2150½	49½	2.2

TABLE 2.—*Electric Pig-Iron Furnaces*

No.	Place	Company	Capacity in hp.	In use since	To be operated	Remarks
1	Trollhättan	Strömsnäs Jernverks A. B. Degerfors.....	2500	Nov. 15, 1910	.....	2-Phase 4 Electrodes
1	Domnarfvet	St. Kopparbergs Bergslags A. B. ....	3000	June 15, 1911	.....	
1	Hardanger*	Hardanger Elektrisk Jern-og Staalverk.....	3500	Oct. 20, 1911	1913	3-Phase 6 Electrodes
1	Hardanger*	Hardanger Elektrisk Jern-og Staalverk.....	3500	March 15, 1912	.....	
1	Hagfors	Uddeholms A. B. ....	3000	Aug. 1, 1912	.....	
1	Hagfors	Uddeholms A. B. ....	3000	.....	May, 1913	
1	Hagfors	Uddeholms A. B. ....	3000	.....	.....	

\*In Norway. Others are in Sweden.

The furnace at Trollhättan was built and operated by the Jernkontor for investigation purposes. Questions of practical interest were studied, such as the behavior of different kinds of ore, the addition of fine ore and the influence of various fuels. Since October 1, 1912, this furnace has not been in the hands of the Jernkontor, but it was taken over by a Swedish iron company, the Strömsnäs Jernverks Company in Degerfors, which is now operating it in the production of charcoal pig iron for open-hearth furnaces.

In Table 2 is given a list of electric pig-iron furnaces in operation or under construction in Europe.

Besides these there are four 3000-hp. furnaces for Sweden in contemplation which are scheduled to be built in 1913. This addition should raise the annual production of electrical pig iron in Sweden by 36,000 tons.

As regards California reliable information is to the effect that the latest type of furnace for the production of pig iron, which has been developed after six years of experimental work at Héroult in Shasta County, has been operating day and night uninterruptedly since September 5, 1912. Every 24 hours 18 tons of high grade soft pig iron are tapped from it. Two more furnaces of slightly greater capacity are now about completed and the intention is to construct three additional furnaces in the near future. The output would then be over 100 tons of pig iron per day. This furnace is simple and easy to operate. A typical charge consists of 500 kg. of iron ore (70 per cent. magnetite), 135 to 150 kg. of charcoal, 3½ kg. of lime (well burned), and 12½ kg. of quartz. Pig iron has been produced at Héroult in one of the experimental furnaces at \$15 per ton. This was delivered in San Francisco at a cost of \$18, when ordinary pig iron was selling at \$23 to \$26.25 per ton. The ore used contained 69.7 per cent. iron and the coke cost from \$10 to \$13 per ton. The California or Lyon furnace and the Helfenstein furnace in Domnarfvet are of the same type, although they differ in some details.

### Electric Smelting Disappointing in Norway

Since the original appearance of Mr. Neumann's article there have been some less favorable developments in electric smelting, namely, the shutting down of the Hardanger Electrical Iron and Steel Works after an operation of about nine months, and the announcement that the Arendals Fossekompagni has abandoned the construction of its projected iron and steel works. The Hardanger company

Kiruna ore.....	1,046,985 kg.
Tuollavara ore.....	973,375 kg.
Klacka-Lerberg ore.....	406,740 kg.
Klacka-Lerberg fines.....	478,905 kg.
Persberg ore.....	3,780 kg.
Persberg Fines.....	5,045 kg.
Total ore.....	2,914,830 kg.
Limestone.....	169,944 kg.
Charcoal.....	757,596 kg.
Total charge.....	3,842,370 kg.
Iron.....	1,905,865 kg.
Yield of iron from the ore.....	65.38 per cent.
Yield of iron from the ore and limestone.....	61.78 per cent.
Consumption of charcoal per ton of iron.....	397.6 kg.
Time consumed in operating.....	2158 hr. 30 min.
Time not consumed in operating.....	49 hr. 30 min.
Total time consumed.....	2207 hr.
Average burden.....	1,833 kw.
Kw. hours consumed.....	3,957,565
Kw. hours consumed per ton of iron.....	2,076
One kw. year yields.....	4.22 tons pig iron
One kw. year yields.....	3.10 tons pig iron
Electrode consumption.....	8,307 kg.
Electrode consumption per ton of iron.....	2.78 kg.

While from now on detailed information regarding this furnace cannot be expected, the owners have made public some figures regarding the operation from October 1, 1912, to December 31, 1912. These are of special interest because the furnace has now been running for a quarter uniformly on the same charge, already tried out, whereas in the earlier experiments the furnace really

has transferred its 14,000 electric horse power to a French company which will employ it in another industry. It is stated that the erection of iron works by the Arendals Fossekompagni is not permanently abandoned, but only postponed, though the company has disposed of a large part of its electric horse power.

The process used by the Hardanger company was that of the Elektrometal Company. The real goal aimed at was the production of 3 tons of iron per horse power per year, based on figures from the experiments made at Domnarfvet, but using a larger furnace. It is now discovered that a mistake has been made in Norway, where no charcoal is available, in taking a too sanguine view of the conditions. Repeated attempts to bring the furnace up to the efficiency desired failed and the producing capacity decreased, while the pig iron was of constantly lessening uniformity. Prominent Norwegian engineers reported that

production could not be profitably continued under such conditions, even with an increase in capacity. It is hoped that the results of the working of the new 12,000-hp. furnace at Domnarfvet, which will be made public in the coming summer, will be encouraging.

Better reports are given regarding the Norwegian process now employed at the Tinfos Iron Works. Based on experiments started in 1909, which with improvements gave promising results, a company was formed in December, 1910, with a capital of £55,555, called the Tinfos Ironworks. It has already harnessed 5000 of a possible 10,000 electric horse power, sufficient to work these furnaces. The first of these was completed in September, 1912, and the other two were nearly finished. The production of the first furnace was 10 tons of electric pig iron per 24 hours. A smaller furnace, in operation at the Alefos Ironworks, produced 300 tons last year.

## Buying, Selling and Advertising Maxims\*

### How Buying for the Factory Should be Conducted —Attitude Toward Selling and Management of Salesmen—Fundamentals in Advertising

—BY STUART DEAN—

In every plant money may be saved by obtaining bids on all material bought; a difference in prices is always found for the same grade of material made by different firms.

Never buy in excess of your needs. Over-buying is a common fault and a bad one. Every dollar's worth of unnecessary stock represents idle capital unnecessarily risked. It would be better to place the money that is uselessly tied up in rough or finished material out at interest. Let it bring in an income. A hand-to-mouth plan of ordering is best, provided that sufficient material is always on hand or on order to keep the machines supplied. An idle machine earns no money for the plant.

Order so that you will receive a small, steady stream of material for the machines, just enough so that the machines will keep the assemblers busy making finished product. Have no stock on hand in the rough or finished state except that which is necessary for work moving through the plant. This insures all money spent for material and pay roll showing up in finished machines.

#### Watching the Cost of Material in Stock Bins

A  $\frac{1}{8}$ -in. nut costs one cent. A bin full of  $\frac{1}{8}$ -in. nuts is the same as a bin full of pennies. Look at your piles of stock on hand in this light. Go from bin to bin, shelf to shelf, and rack to rack, with a pencil and paper, and estimate the cash value tied up in each. You will then begin to see where you can cut down this tied-up capital. Let the firm from whom you buy carry your stock.

A system used by some firms is to mark the material bins with the maximum and minimum amounts of each class of material, rough and finished, to carry in stock and the amount to order. This is a good practice, and it prevents too much money being tied up in unused stock. The clerical labor necessary to carry out this scheme, though, should be watched, so that the pay roll is not increased. If you have to put on an extra man to look after these maximum and minimum quantities, he will cost from \$700 to \$1000 per year. A lot of stock could be bought for less than this amount. Every added expense of this character should be made to pay for itself, and to yield a profit in addition—not a bookkeeping profit, but a profit of real dollars at the end of the year. If you increase the pay roll to take care of the stock, you must, by means of this added expense, be able to increase the profit of some or

all of the manufacturing departments. If this cannot be done, the change is not worth the expense.

#### Manufacturing Finished Machines Not Finished Parts

Run your product through in exact lots. If you decide to make twenty-five machines of a certain size, get out the material for all the parts of the twenty-five machines down to the last small piece. Run no more parts through than are enough for the twenty-five, no matter what the temptation may be, to run more of any one piece. If some parts have to be scrapped, start through enough more to bring the number up to twenty-five.

Besides the advantage of the great reduction in the running capital needed to carry on the business, there will be an enormous gain in space that was previously occupied in storing finished parts. This will give room for putting on more men, and thus increase your output, and likewise your profit, with no additional buildings or ground space.

Keep in mind that the object of manufacturing is to make finished machines, not finished parts. Not long ago I received from an establishment that had failed a list of material that it had on hand of which it wished to dispose. It showed that the firm had violated this rule. They had an overstock of everything.

#### The Selling Department

A firm must have a persistent determined selling system which will dispose of its full plant capacity at the least expense. The head of the selling department should not spend too large a proportion of his time at correspondence with customers, or actual selling, but should occupy himself in establishing more and better agents and dealers, and in writing to them often. He should see that the amount of goods which they sell is in correct proportion to the population of the district. Each agent and dealer should receive a letter of some sort, about sealing, from the sales head every few days.

The firm should have a system of keeping track of the daily operations of its traveling men. It is well to send out three traveling men, first giving them complete instructions on all the selling points of the product, with the route of each laid out. An expense and sales record of each man is necessary in order to ascertain the percentage relation between his expenses and the value of his orders.

After three or four months' trial, the traveling man whose orders cost the most to get may be replaced by a new man. A schedule can be made in time giving the rate of improvement a new man must make to hold his job.

\*Copyright, 1913, by Stuart Dean. Nineteenth and next to the last article on Shop and Foundry Management. The eighteenth article, "Cutting the Cost of Power for the Factory" was printed in the issue of April 17.

The standing of a salesman should depend upon the value of his sales as compared with the business population of his district. The salesman who has the best district should send in the greatest value of orders. A well-established district will make selling easy. A man who is placed in a district from which few orders in the past have come should not be expected to make the sales of one who is in a well-established district.

A salesman should be kept in one district as much as possible. He becomes more valuable as he gets acquainted with the people in the district. People will listen to a pleasant fellow the third time he comes around, when possibly they won't the first.

#### Questions for the Traveling Man

The traveling man should ask the following questions of the possible customer, if he can work them into his conversation without causing offense:

1. "What trade papers do you pay the most attention to?" The object of this is to find what papers are best to advertise in.

2. "What time of the year do you generally do your overhauling or buying?" The object is to find out when to go after this particular man's business; when is the best time to send business-getting letters and traveling men to his style of business. Selling to be done right, should be handled systematically. The salesmen, the advertising literature, and the trade paper advertising, should be sent forth at the time when each dollar spent will bring in the greatest return.

3. "What do you pay for competitors' goods?"

4. "What objections have you to our product?" These objections will be entered in a book kept for this purpose. A convincing answer will be thought up for each objection and entered in the book. Make a correction in the design of the product, if there is any foundation for criticism.

5. "What objections have you to our competitors' make of machinery?" Enter these in the book. Salesmen must learn the contents of this book, for it will contain a good series of selling arguments.

#### Routing the Traveling Men

Use the map and tack system for routing traveling men. Divide the country into districts, with a very large city as a center for each district. Let the traveling man for the district live in the large city. This will give a low cost of selling in the large city, with no hotel expenses, and with short trips. Credit the salesman for all orders that come from his district. Each district must be charged with a pro rate to cover advertising, catalogues, circular letter writing, and expense of head sales manager. The pro rate charge will be proportioned to each district in accordance with the density of the buying population of the district.

The district where the factory is located will be the educational district for new salesmen. Better weeding out can be done here, as the new man is under the immediate eye of the sales manager.

There are wonderful salesmen in the world; geniuses in their line; men that can sell anything. A firm must never be satisfied with those who barely make good, but must keep trying until their men are all wonders.

The sales manager should instill enthusiasm into traveling men by frequent talks. When on the road they should receive a letter daily from the home office. A letter received by a man each day about his work is the same as a foreman coming around looking over the work. Nothing will boost him along like these letters; they prevent discouragement. Dealers should also be written to often for the same reason, as stated.

The names of the firms that are enormous buyers should be known, and the amount of business they probably could give, and also how much should be spent each year in order to obtain their business. Some of these concerns

may buy enough to make it pay to have a man constantly sitting on their door step.

#### Selling Just as Tangible as Manufacturing

Selling must not be considered in a hazy sort of light. It must not be considered a case of luck that orders happen to come in. Selling is just as tangible a business as manufacturing. In proportion to the number of salesmen out, agents talking the goods, advertising, etc., will be the volume of business taken in. If a manufacturer had to double his plant output, he would have to double the force of workmen in his plant. The same is true of selling. Four salesmen will sell twice as much as two, provided they are good salesmen and are well directed, and salesmen have to be directed the same as producers in the shop. The sales manager has to give his full time to directing. The sales manager is a foreman over the salesmen. Work would soon be turned out at a loss in the shop if the men were not directed. The same is true of selling.

Like manufacturing, the selling must be directed on the most economical lines. The money spent for advertising must be spent where it will bring in the greatest return. Each year a firm should have more and better dealers than they had the year before, and more and better salesmen. If a firm does not reach out in the selling department, it will never be able to reach out in the manufacturing department.

Circular letter writing should be pushed to the limit. The letters should be written on the regular paper that the firm usually uses, not on a cheap grade of paper. A large mail sack of letters should leave the office every day.

The selling price of the product must be as low as that of competitors. To make a profit, selling at this price, the product must be of an inexpensive design to build, the most inexpensive manufacturing methods must be used, a maximum output per man must be obtained, the overhead expense must be kept down, the material must be bought at lowest possible prices and the stock on hand must be kept at the minimum.

#### The Personality of the Salesman

The salesman must have energy and enthusiasm. He must be of a very pleasing personality. He must be a kind of person delightful to have around; a kind of man whose arrival the buyers look forward to. When the best salesman comes into an office, generally all work stops. He is such a delightful person, such a good all-around talker, that all hands sit down and have a regular talk feast. Half the battle is won if the customer is pleased to see the salesman.

I remember one of the largest and oldest lathe builders in Cincinnati related a little incident about selling, which illustrates this point of a pleasing personality in salesmanship. A man, who in former times had been on bad terms with the Cincinnati lathe builder, was in the market for twelve lathes and swore that he would not buy a lathe from his old enemy under any consideration. The Cincinnati lathe builder sent his best salesman to see this antagonistic customer. The salesman brought back the order for the dozen lathes. The lathe builder asked the salesman how he managed to get the order. "Tell me just what you said and what he said. Give me the whole conversation. Didn't the buyer show great antagonism to us?" The salesman said: "Yes. He came out to see me and started in a regular tirade against our firm and our lathes. Said he would let his plant rot down before he would buy one of our lathes." The lathe builder asked what the salesman did then. The salesman said: "I just laughed." "What did he do then?" asked the lathe builder. "He just laughed," said the salesman. It was the laugh that sold the lathes.

#### The Points to Be Made in Advertising

The object of advertising is to instill into the mind of every possible buyer these four things: The firm's name;

the location of the firm; the class of goods manufactured and sold; and why they are more desirable than other firms' goods.

When getting up an advertisement the advertiser should decide what proportion of the space to give to each of these four points. That point should be made the most prominent which is the hardest to impress on the reader; that point in which he is interested the least. This is undoubtedly the firm's name. No matter how good an advertisement be, it is a failure if the firm's name is not impressed on the reader. A reader will look through pages of advertising and never have a firm's name impressed on him. This is the one point that he is the least interested in.

A manufacturer becomes so familiar with his own name that he is liable to overlook the fact that he is unknown to the great majority of people. If he doubts this, let him ask his traveling men whether or not they find people who have never heard of the firm. The traveling men are coming in contact with such people every day.

I remember my general foreman saying of an advertisement: "That's a fine, catchy advertisement." I asked him whose advertisement it was. He said, "Oh, I didn't notice. I was only speaking of the advertisement."

Once we sent out a lot of beautiful little glass clocks, with the firm's name across the faces in small, neat letters. One of our firm went to see a large institution in our state which was in the market for our product. The head of the institution said: "I am very sorry, but we have just ordered. To tell you the truth, I did not know there was a pump manufacturer in our state." The member of our firm then said: "That little clock ticking there on your desk is an advertisement that we sent you." The manager picked it up and said: "Well, do you know, I have had that on my desk for six months and this is the first time I ever looked at the name."

Few people know the name on their office calendar. It is the firm's name that is the hardest thing to impress on the reader of an advertisement. This must then be given the greatest proportion of the space.

The second point is locality, which should take up the least space, because the name of the town is probably familiar to the reader, and is easily impressed on his mind. The advertising space must be economically used.

The third point is what the firm manufactures. A small cut of the product, occupying about one-tenth as much space as the firm's name, will catch the reader's eye and impress this point on him. Therefore, cuts should be small.

The fourth point is the descriptive matter. This should be changed often.

#### Differences to Be Observed in Pamphlets and Catalogues

The pamphlet that is sent out by mail, with the circular letter, should be full of pictures. Reading is mental work. It requires effort on the part of a person to read something in which he is not interested. On the other hand, looking at pictures is a recreation. If the tale can be told in pictures, the busy man who gets the pamphlet will give it a glance at least before it goes to the waste basket.

The catalogue that is sent in answer to an inquiry should be different. It should have both pictures and reading matter. In this catalogue should be given all the advantages and good points of the product.

In all styles of advertising literature the firm's name should be worked into the reading matter as much as possible. It should appear under every cut. For instance, if the engine is built by Jones & Co., under the cut of the 20-hp. engine should be the words "20-hp. Jones Engine." In the reading matter will appear, "The Jones valve gear is such and such. The Jones governor, etc." The idea when getting up advertising literature is to keep in mind that the whole advertisement will be lost if the firm's name is not remembered.

#### Book Reviews

**Electric Furnaces in the Iron and Steel Industry.** By W. Rodenhauser and I. Schoenawa. Translated from the German, with additions based on his own experiences, by C. H. Vom Eaur. Cloth, pages xvi+404. 6½ x 9¼ in. Published by John Wiley & Sons, New York City. Price, \$3.50.

This highly interesting and valuable book comes out at a very opportune time—a time when the production of pig iron and steel by electricity is assuming increasing importance.

The book is divided into two parts. Part I treats of "Electric Furnaces, Their Theory, Construction and Criticism." Part II deals with "Materials for Furnace Construction and the Cost of Operation" and "The Electro-Metallurgy of Iron and Steel." Chapter I is of an interesting historical nature, while Chapters II, III and IV deal in a scientific manner with the fundamental laws and principles of electricity, electric currents, etc. In Chapter V the "General Conditions for the Operation of Electric Furnaces" are discussed very fully. Then follows a chapter on "The Arc Furnaces in General," after which each important furnace is discussed in full—the Stassano, the Héroult and the Girod. The induction furnaces are then taken up with full discussions of the Kjellin and Röchling-Rodenhauser types. A very important chapter is devoted to "The Electric Shaft Furnace," in which are treated those furnaces devoted especially to producing pig iron, with particular reference to the European ones. Part I closes with a general review and with a notably complete table giving a list of all the electric furnaces in operation or building in Europe and America. This table also furnishes detailed information regarding each furnace and is very valuable and up-to-date.

Part II is devoted to a discussion of the various materials that enter into the construction of electric furnaces and the costs of operation. Both of these matters are gone into fully and thoroughly. Under the general title of "The Electro-Metallurgy of Iron and Steel" the authors go into a delineation of the practical application of electric furnaces to the production of pig iron or steel from the ores and to their availability for refining pig iron or steel and producing ordinary or special qualities of steel. The many phases of these various subjects are discussed from a theoretical and practical standpoint, many examples of actual operations being cited, and comparisons made with open hearth and other processes.

The authors are both electrical engineers and metallurgists of wide practical experience. Their presentation is a scientific and practical one and there is no partiality shown for one furnace over another, the reader being left free to make his selection according to the facts and to his needs. The book is one that fills a demand felt by every practical and scientific man and it is written to suit all needs. The closing sentence is worthy of repetition: "The result is that the electric furnace will not only play an important role in the future, but that it is already a factor which each iron and steel plant must now carefully consider."

**The Measurement of High Temperatures.** By G. K. Burgess and H. LeChatelier. Pages xviii + 510, 6½ x 9¼ in. Cloth. Published by John Wiley & Sons, New York. Price, \$4.

Any book on this important subject to which is attached the name of LeChatelier at once commands attention. This is the third edition, rewritten and enlarged. It is really the original translated work of this great French physicist, rewritten by Mr. Burgess of the Bureau of Standards and brought up to date. The great progress in the measurement of temperatures has been carefully followed by this expert and much of the important part of the volume is due to him. In the words of Mr. LeChatelier in his preface, "This book is much more Mr. Burgess's work than mine, which enables me to praise it as it deserves, and state that this publication will render great service, both to investigators and engineers."

The work is historical in its scope so as to satisfy the student; it is practical in its application to the engineer in his efforts to adapt some method or instrument to a particular technical operation; and it is valuable to the investigator who is interested in accurate methods of measurement and their adaptability to his needs.

The principles of every type of instrument are thoroughly treated. The manufacturers of all kinds of pyrometers were consulted and much of the valuable information secured from them has been incorporated in the book, resulting thus in the printing of much that has heretofore been unpublished.

**Foundry Practice.** By R. H. Palmer. Pages vii + 332, 5 3/4 x 8 1/4 in. Published by John Wiley & Sons, New York. First edition; cloth. Price, \$2.

The author—a molder, foreman and superintendent of foundries—was at one time an instructor in foundry practice at the Worcester Polytechnic Institute, Worcester, Mass. Having found the need of some kind of instruction book, the author has presented in this volume the scheme he used, endeavoring to make a text book for the student, apprentice and molder rather than a reference book for an experienced foundryman.

The book deals primarily with molding as applied to iron castings. Chapters I to 11 cover the general rules and methods for molding various kinds of patterns, and also deal with floor molding, light crane work, molding with sweeps, skin-dried and dry-sand molding. The chapter devoted to loam molding is one of the most important in the book. The making of cores, use of chaplets, gates and gating, heading and cleaning of castings have each a chapter, and an important one is devoted to Molding Machines. Methods of mending broken castings are discussed, no mention being made, however, of electric welding. There is one chapter fully describing molders' tools and one that deals in general with foundry sands for iron castings only. The metallurgical phase of the subject is briefly outlined in chapters devoted to Iron and Its Composition, the Cupola and Its Operation, the Air Furnace and the Brass Foundry.

The important subject of steel castings is only briefly touched upon, and there is no mention of malleable castings except a definition. There is a full glossary, with an appendix containing useful tables, analyses, etc. Numerous views are given illustrating molding processes. The book should be in demand for practical teaching purposes.

**Metallurgy.** By Herbert Lang. Volume I. Pages xi + 248, 6 1/2 x 9 1/2 in. Published by the McGraw-Hill Book Company, New York. Price, \$3.

This is the first volume of a series of three on this subject, the other two volumes not having yet appeared. The intention of the author is to group the contents of the volumes in such a way that each shall have a character of its own, and to condense and correlate the great mass of widely published data on various metallurgical processes. This volume deals primarily and in a general way with the simpler phases of the subject, such as ore sampling, ore crushing and the roasting of ore. The relation of processes is presented in the form of tables, convenient for reference, a detailed discussion being avoided as too extensive. A chapter devoted to the smoke of metallurgical works covers the subject from every point of view. The two volumes yet to come are to deal with processes exclusively, and this volume is to be considered as largely introductory.

**Mechanical Drawing.** By Otho M. Graves, assistant professor of graphics, Lafayette College. Pages, vi + 139, 6 x 9 in.; generously illustrated. Published by the Chemical Publishing Company, Easton, Pa. Price, \$2.

Although many books have been published on drafting, the treatise by Professor Graves is well worth special consideration. The book, containing 140 pages and profusely illustrated, states in a concise manner the fundamental principles of drafting, and will be very helpful to the student who wishes to learn this subject without the assistance of an instructor, but it may also be used advantageously in the class room. The opening portion describes the use of the various instruments and general instruction in regard to the preparation of drawings and tracings. One chapter is devoted to a description of conic sections.

The discussion on orthographic projections is well treated, and covers this subject sufficiently to give the young draftsman a working knowledge of the methods of making the projections needed in designing. The methods of laying out the helix, bolts and screw threads are taken up and the volume concludes with a short description of tracing and printing.

Probably the most useful feature is an appendix devoted to a suggested course in mechanical drawing, including 22 plates carefully arranged in progressive stages, permitting an instructor to assign problems of differing data to students at adjacent tables.

**Exporters' Encyclopedia, 1913.** Pages viii + 1024, 6 x 8 1/4 in. Published by the Exporters' Encyclopædia Company, New York. Ninth edition, cloth. Price, \$7.50.

The regular yearly edition of this encyclopædia is up to its usual standard and is indispensable to all firms making export shipments. It gives complete directions as to routes and methods of shipment to every country in the world and apparently answers every possible question, besides giving valuable information about the countries themselves. It is corrected monthly by special circulars and all subscribers receive the Exporters' Review for the year. It is a valuable time-saver to any shipper.

### The Steel Industry in Italy

Italian journals have much to say of the prospects of the iron and steel industry of that country, and the distinction is sharply made between armament undertakings and the manufacturers of other iron and steel products. Professor Einandi contends that the delivery and quality of materials for war is of first importance and that foreign firms are less reliable than Italian. On the other hand, Signor Riboni, of the Royal Mining Board of Naples, says that very little material is supplied by Italian industries to armament firms, which are getting their needs filled from abroad with no difficulty.

As to the future of iron ore supplies considerable difference of opinion exists. Signor Riboni contends that only the situation of the Societa de Cogne can be regarded as really favorable and predicts the exhaustion of the deposits on Elba. An examination of statistics leads him to the conclusion "that if Italy imported most of the iron and steel products now made in the country the state would have received \$12,000,000 per annum in duties." This sum is, however, only one-fourth of the loss which the Italian nation sustains from the system of import duties, and Signor Riboni consequently recommends the abolition of any protection. The Italian Iron and Steel Syndicate comes back with the statement that the export trade in iron ore is not as remunerative as some have tried to prove and it disputes any possible exhaustion of the Elba deposits in the near future.

There is an interesting allusion to Germany. That country, it is declared, does not engage in export trade at a loss, except in the case of Italy, where Germany sells at a reduction of as much as \$9.50 per ton. It is stated that "according to the agreements of the Düsseldorf Syndicate, Italy is divided into two zones, of which the southern is left to Belgium, and all deliveries to Italian ports enjoy a rebate of \$2 per ton."

The total production of pig iron in Italy in 1912 was the greatest on record—373,153 metric tons, or 70,222 more than in 1911. The imports were 267,479 tons and exports 51 tons, making a total home consumption of 641,581 tons, or 103,170 tons in excess of 1911. Great Britain furnished the largest part of this importation, 145,829 metric tons, and Germany 74,136 tons. The total imports of iron and steel products, including pig iron, were 953,182 metric tons for 1912, a decrease of 8063 tons from 1911. Italian exports of manufactured iron and steel, like the exports of pig iron, are practically negligible, being only about 6000 tons yearly.

The Brown Hoisting Machinery Company, Cleveland, Ohio, has been informally awarded the contract by the United States Government for 8 locomotive cranes to be used at Pearl Harbor, Hawaiian Islands. Bids were received a few days ago for 11 cranes, but it was decided to purchase only 8 at present. The company reports a good demand for its locomotive cranes. Several orders have recently been received from Mexico in spite of the political disturbances in that country. Among its recent shipments of locomotive cranes was one to the North Cape of Norway within the Arctic Circle, where it will be used for handling coal. It has recently secured a contract for a coal-handling bridge for the Edison Electric Illuminating Company, Boston, Mass.

# Specifications for Wood Block Floors

## How the Foundations, Cushions, Joints and Other Features of a Popular Type of Factory Floor Should Be Laid

The relative advantages ascribed to various types of floors for manufacturing plants are pretty generally known. Among these the qualities of the creosoted wood block flooring have earned for themselves a special prominence. Not much emphasis, however, has been placed upon the necessity of properly laying floors, particularly those of the wood block type. A very large part, if not all of the effectiveness of this flooring is dependent on the manner in which it is laid. To serve as a guide for the correct laying down of the wood block flooring under ordinary conditions, the Ayer & Lord Tie Company, Chicago, has prepared a set of general specifications, which are here

or with approved mixing machines, until each particle of stone, slag or gravel is covered with mortar. The concrete foundation shall be 4 to 6 in. in depth, depending on the amount of traffic the pavement is to bear. The concrete is to be deposited in a layer in such quantities that after being thoroughly rammed or tamped in place it will be true and uniform. The upper surface should be troweled so as to obtain an even surface and establishing a perfect subgrade  $3\frac{1}{2}$  in. below the established level of the finished floor when a 3-in. deep block is used. In hot weather or where the mixture is exposed to the sun while laying, the concrete shall be kept moist so as to prevent checking or



Shipping Floor of Wood Blocks at Plant of Automatic Sprinkler Company, Youngstown, Ohio, Subject to Constant Movement of Heavy Materials

given in part. These specifications do not presume to cover special conditions where, for example, a floor is continuously wet and the atmosphere of the interior of the plant is moist and hot. Under such conditions it might be advisable to lay the blocks without a cushion of any kind, it is suggested, and in addition, it might be necessary to add a tar binder for filling in all joints. The specifications are as follows:

### Piping:

Before laying the concrete sub-floor, all piping and conduits shall be installed. The filling to be thoroughly puddled and left to become quite dry. Hollow places, if any, are to be filled with solid earth. The steam piping is to be at least 1 ft. below the bottom of the concrete foundation.

### Subgrade:

The entire area should be graded. All necessary filling should be pure, clean sand or earth, free from rubbish and material subject to decay, or material that will not pack and form a solid foundation. Where it is possible the subgrade should be tamped or thoroughly rolled with a 5-ton steam roller before placing the concrete foundation.

### Concrete Foundation:

After the subgrade has been thoroughly compacted, the concrete foundation shall be laid, consisting of a mixture of 1 part cement, 3 parts of sand or limestone screenings and 6 parts of limestone open-hearth slag or clean washed gravel. The mixings can either be done on tight platforms

setting too quick. It shall be protected from injury and shall lie until thoroughly hard before being covered with the cushion.

### Cushion:

a.—Upon the concrete foundation shall be spread a  $1\frac{1}{2}$ -in. course of torpedo or coarse sand. This shall be uniform in thickness and brought to an even surface by the use of a templet, and shall establish an even grade 3 in. below the established level of the finished floor.

b.—Upon the concrete foundation shall be spread a layer composed of 1 part of Portland cement and 4 parts torpedo sand, free from loam and dirt, thoroughly mixed dry and in sufficient quantity to insure when compacted a uniform thickness of  $\frac{1}{2}$  in. This mixture shall be brought to a uniform level by means of a templet 3 in. below the established level finished floor.

### Expansion Joints:

Expansion joints shall be formed by placing a 1-in. board on edge against the sides of the building and around all pillars, foundations, etc. These strips shall be left until all the blocks have been laid, tamped or rolled when they shall be removed and the voids filled with asphalt or paving pitch as hereinafter specified.

### Laying:

On the cushion the blocks shall be laid with the fiber of the wood running in the direction of the depth. The courses shall break joints alternately by a lap of not less than 2 in. and the blocks shall be set tightly together. Care

should be taken to lay the courses parallel. Not less than half blocks should be used except in closures.

*Tamping:*

After the blocks are in place they shall be swept clean and tamped under a board or rolled with a roller as heavy as convenient up to 5 tons in order to bring them to a uniform surface. If a block is found the least bit too low, let it be taken out and more sand put under it until it conforms to the established contour.

*Filler for Expansion Joints:*

After the pavement has been thoroughly rolled the strips shall be carefully taken out without disturbing the adjacent blocks, and this void shall be filled to  $\frac{1}{2}$  in. of the wearing surface with hot asphalt or paving pitch of standard quality.

*Sand Dressing:*

Immediately after the joints have been filled the surface of the floor shall then be covered with fine dry sharp sand free from loam which shall be thoroughly brushed into the voids. This sand to be left on the surface when possible for about a week, and then the pavement swept.

### German Cranes for the Panama Canal

The Isthmian Canal Commission April 18 awarded a contract for two huge floating cranes to the Deutsche Maschinenfabrik Aktiengesellschaft, Duisburg, Germany, whose agents in the United States are Neumeyer & Dimond, 82 Beaver street, New York. The award was given to the German bidder with the approval of President Wilson and Secretary of War Garrison, as a result of the great difference between German and American bids. The Germans offered the cranes at \$837,500, or \$600,000 less than asked by an American crane builder at Cleveland, Ohio. The German firm also promised delivery in 580 days, or 100 days sooner than the American firm would guarantee.

The cranes are of the revolving type, and it is claimed that they will be the largest floating cranes in the world. They can be used separately or together. Each produces its own electric power and will be capable of lifting 300 tons. They will equal in height an 18-story building, and each will have a boom with an outreach of 82 ft. and will be able to revolve with its load and take up or deposit its



Wood Block Floor at Plant of Columbia Steel Company, Elyria, Ohio, Where Continuous Hauling Has Not Shown Creeping of the Blocks Nor Caused Ruts

*Timber:*

Timber shall be long leaf yellow pine and shall be sound, square edged, free from bark, shakes, large, loose or rotten knots, red heart, worm or knotholes or any other defects which will be detrimental to its strength or durability. The annual rings in 3 in. measured radially from the center of the heart shall average not less than eight to the inch. No second growth timber or loblolly pine will be accepted. The timber to be surfaced one side before cutting into blocks, to insure uniform width.

*Blocks:*

Blocks shall be cut from thoroughly air seasoned timber as specified and shall be not less than 5 in. in length nor more than 10 in., and shall average 8 in. in length. The blocks shall be 3,  $3\frac{1}{2}$  or 4 in. in depth (figured with the grain), according to the class of service required and 3 to 4 in. wide, all blocks, however, to be of the same width for any one job. All blocks shall be uniformly manufactured.

The Ayer & Lord Tie Company has also prepared a specification covering the creosote which should be used and the method of treating the wood. The creosote, it is stated, should be pure distillate oil obtained entirely from coal gas or coke oven tar. A distilling test to which the creosote should be subjected has also been drawn up. The process specified is what is known as the Rueping process, the block treated to contain not less than 8 lb. of oil as specified to the cubic foot of timber.

load anywhere in the radius of its circle, without moving the floating pontoon on which the crane is erected. The pontoons will be 150 ft. long by 88 ft. wide and 16 ft. deep, of steel plate. There are no such cranes in use in this country. They will be used in connection with the ship repair yards at the terminal of the canal and will be completed and delivered before the completion of the canal.

The General Electric Company, Schenectady, N. Y., has received the following orders from steel manufacturers: Spang, Chalfant & Co., Inc., Pittsburgh, Pa., for an 1875 kva. Curtis turbo-generator with 75 kw. turbo-exciters; Sharon Steel Hoop Company, Sharon, Pa., a 750 kw. generator; Jones & Laughlin Steel Company, for its Aliquippa plant, 14 motors with controllers ranging from 7 to 50 hp.; Brier Hill Steel Company, Youngstown, Ohio, two additional 100-hp. motors and a 20-ton industrial electric locomotive. Other noteworthy orders are as follows: Chicago, Rock Island & Pacific Railroad, for its shops at Kansas City, Kan., a 450 kva. alternating current generator with 12 kw. exciter, switchboard and 25 motors ranging from 5 to 75 hp.; Edison Storage Battery Company, Orange, N. J., two 500 kw. rotary converters, two 200 kw. 3-unit 4-bearing motor-generator sets, four 250 kva. transformers and switchboard apparatus; Pittsburgh Screw & Bolt Company, Pittsburgh, a 100 kw. 2-unit 3-bearing motor-generator set and 16 motors ranging from 5 hp. to 50 hp.

## A Special Large Motor-Driven Lathe

A Recently Developed Machine Tool  
for Use in a Bridge Fabricating Shop

The Bridgeford Machine Tool Works, Rochester, N. Y., is building a 48-in. motor-driven lathe for the Gary plant of the American Bridge Company. In general appearance it is the same as the company's standard tool with the exception that it is very long, being capable of accommodating pieces measuring 35 ft. in length. Fig. 1 shows the type of lathe, while a view of the geared headstock showing the arrangement of the various operating levers is given in Fig. 2.

The bed is reinforced by heavy box-pattern cross

on the shears, and both front and rear tool rests are furnished.

The power for driving the machine is supplied by a 35-hp. constant speed motor mounted on the machine, as shown in Fig. 2, and transmitting power through an 8-in. belt. The cutting speeds, of which there are 15 arranged in approximately geometrical progression, are obtained through a speed variator. All of the driving gears with the exception of the one for the face plate are of steel cut from the solid, and all of the gears within the headstock and the spindle bearings are lubricated by a common oil bath. The changing of the spindle speeds is accomplished by shifting conveniently located levers on the outside of the headstock. The change gears, which are cut with from 1 to 16 threads per inch, are pro-

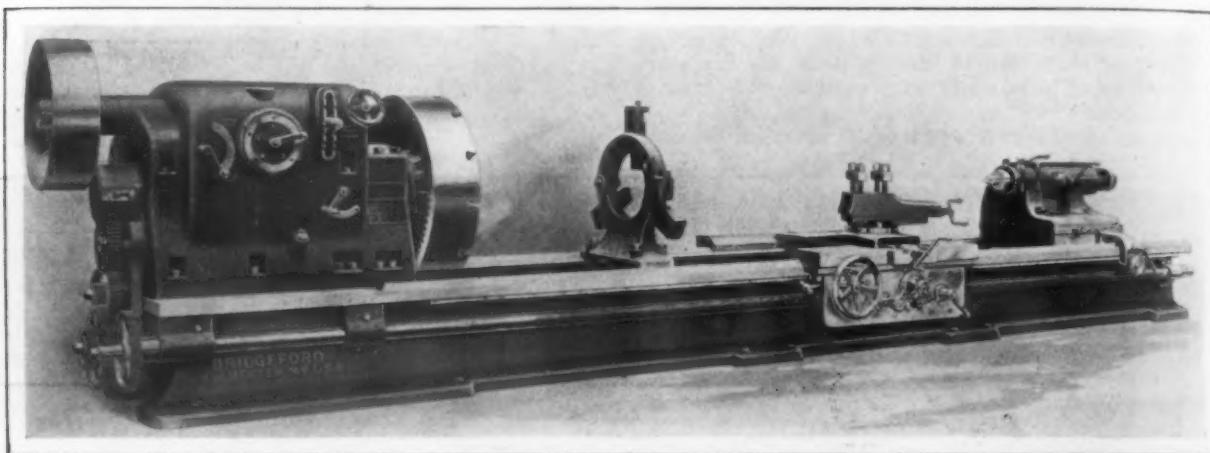


Fig. 1—A 48-In. Lathe with a Patent Geared Head

ties and a longitudinal rib which has a cast-steel rack 2 in. wide. A pawl at the back of the tailstock engages with the rack to form a positive stop, which is found of advantage when the lathe is handling heavy work. The shape of the tailstock is such that it will clear the compound rest when angular work is being turned, and it is possible to set the tailstock over for turning tapers. The diameter of the tailstock spindle is  $5\frac{15}{16}$  in. The carriage, compound rest and apron are of heavy construction in keeping with the remainder of the lathe. The feeds, both lateral and cross, are driven by independent frictions and can be reversed at the apron. The lead screw is  $2\frac{15}{16}$  in. in diameter and the threads on it are of 2 pitch. The carriage has a bearing 55 in. long

portioned to give from 2.26 to 110.8 revolutions of the driving pulley to one of the face plate, which is 48 in. in diameter and 11 in. wide.

The spindle, which is of crucible steel and is finished by grinding, runs in bronze bearings 9 in. in diameter and 14 in. long. It has a  $1\frac{7}{16}$ -in. hole for removing the tool steel center which is  $3\frac{3}{16}$  in. in diameter. These bearings, in common with all the others of the lathe, have bronze bushings. The face plate is pressed on and keyed to the spindle. The lathe, although rated as a 48-in. tool, has a swing over the ways of 50 in. and over the carriage of 38 in. The total weight of the lathe, exclusive of the motor, is 44,500 lb.

### Rustproof Coating for Iron Patterns

A simple method for avoiding the annoyance of rusted iron patterns is suggested by George Rogers in the American Machinist. He gives them a coat of beeswax, which also makes the patterns leave the sand more freely, saving time in the foundry and producing a better grade of casting. The wax will adhere better if the pattern is a little rusty and it is well to let it rust before applying the wax. The pattern should be heated just enough to melt the wax when applied, care being taken not to melt any solder there might be on it. The wax should be rubbed all over the pattern with a brush to fill up the holes, etc., and the surplus then removed and the pattern left in a cool place until perfectly cold. It is best to rub the pattern with a stiff bristle brush to make it smooth and glossy. Large patterns can be warmed up in a coke oven before applying the wax.

The Board of Trade of St. John, New Brunswick, has issued a statement of improvements and building operations in that city, under date of March 20, which makes an exhibit that would reflect credit on the enterprise and progressiveness of cities of much greater size and wider fame. The improvements total \$56,985,000, and embrace all kinds of construction work, including considerable industrial factory building. The largest item comprises the dry dock ship repair plant and wharves at East St. John, which will cost complete \$24,000,000. In January St. John was the third city in Canada in the number of building permits issued.

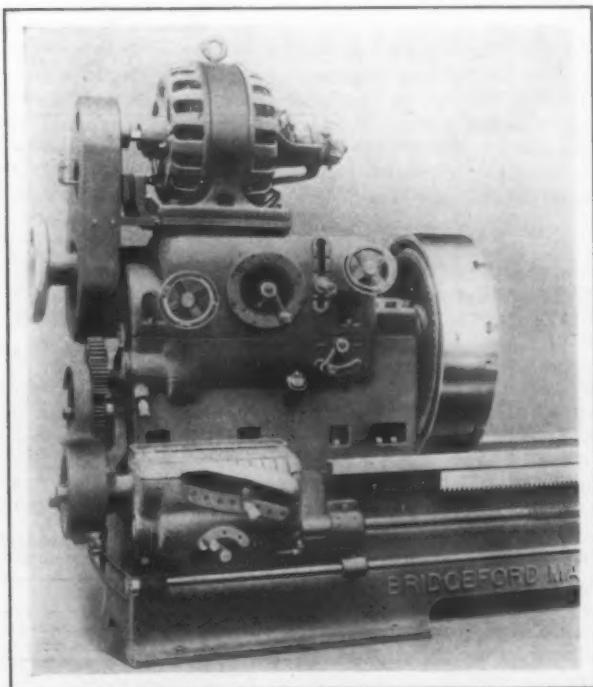


Fig. 2—View of the Headstock Showing the Arrangement of the Various Operating Levers

## Wage Systems and Their Consequences\*

The Attempts to Establish a Fair Day's Work and a Fair Day's Wage

BY C. B. THOMPSON†

Why do progressive employers pay day wages only when they cannot think of any other method? "A fair day's work for a fair day's wage" sounds like an ideal condition of industrial society; day wages would seem to be the proper form of payment. But the day wage system has broken down because the workman secure in his wage was tempted to forget his part of the bargain, a fair day's work, and besides nobody knew what a fair day's work was.

To remedy this employers first tried piece work. Let the workman do what he considers a day's work, and then pay him for what he does. This seemed to be a good solution; but the employer was then tempted to forget his part of the bargain, a fair day's wage; and besides nobody knew what a fair day's wage was. As soon as piece rates got a large output and high wages the rates were cut.

Both day rates and piece rates have failed, for two reasons: first because of the greediness of a large part of human nature, and second because nobody really knew what was a fair day's work or a fair day's wage.

Various expedients have been resorted to in the effort to overcome the inherent defects in day and piece rates. Legislation attempted to settle the matter in England from the fourteenth century to the early nineteenth century, but was abandoned under the influence of Adam Smith's teaching. It tried to protect workmen against oppression, employers against extortion. It set a wage rate, but did not determine what was a fair day's work and, therefore, failed. The supremacy of the employer which accompanied the breakdown of legislation was then met by the development of trades unions. The unions again attempted to set rates but again failed to standardize the day's work. The problem was therefore not only not solved but has driven employers into organization and has developed two fighting camps to the detriment of both.

### Shortcomings of Welfare Work

This warfare has led to attempts to harmonize the relations of workmen and employers, to establish a community of interest. The first idea was to leave the methods of payment unchanged and to secure co-operation by kindness and the development of loyalty. This was the method of Robert Owen and his successors in "welfare work." This has failed usually because it is personal, capricious, mollycoddling and often open to suspicion. This was followed by the attempt to secure a real community of interest through sharing in the proceeds, as in the various profit-sharing and pension plans. This also usually fails because the reward is too remote, the permanence of the scheme uncertain, its administration open to suspicion and the partnership in gains but not in losses essentially unfair.

These methods were succeeded by a whole crop of premium plans, such as the Towne-Halsey plan, the Rowan plan, etc. These plans aim to get results by curbing the greed of employers and by the stimulus of immediate and visible reward to the employee. These plans are in fairly common and sometimes effective use. But they are subject to abuse and are not permanently satisfactory because they are based on a shifting sand of uncertainty as to first, what is a fair basic rate, and second what is a fair day's work. A strong union or an active public sentiment could protect the workman in his basic rate; but both the employer and the honest workman were left at sea as to the accomplishment that should be secured.

### Establishing What Is a Fair Day's Work

F. W. Taylor's work at the Midvale Steel Company is the first recorded attempt to supply a definite base to one side of the arch—to determine accurately what is a fair day's work; and to supply at least a partial base to the other side—by establishing a method of fair payment for that work in accordance with achievement. The differential piece rate, the Gantt bonus, the Emerson bonus are

all based on the idea of a definite amount of work to be done and a definite increase of reward as this amount of work is accomplished. These plans rest fundamentally on an accurate scientific time study of the elementary operations involved in all work. They proceed on an analysis of work into its elementary motions, the standardization of activity by the elimination of unnecessary or awkward motions and the determination of the best time in which the resulting standards may be done with permanent satisfaction to the worker. This includes, of course, an equally accurate determination of the proper allowance to be made for fatigue, necessary rest and delays. The standards established by such study when accurately and scientifically done are facts as definite, impersonal and unchangeable as the facts of physics or chemistry.

As this method goes to the root of the problem, its consequences are radical and revolutionary. The successful setting and administration of a task and bonus involves a whole new system of management; a new attitude (that of the scientific investigator) toward the problem of organization, and a new moral attitude—the substitution of a passion for truth for the reliance on ignorance and bluff. It is this spirit which converts the mechanism of the Taylor system into a living thing, the most vital force in industry today.

The arch of industrial justice is not yet firmly fixed, however; for while one base, the fair day's work, is in process of being established, the other base, the fair day's wage, is not yet determined. The Taylor system merely takes the basic rate current in the vicinity and adds to it in proportion to achievement. But this basic rate must still be set in some way. Legislation cannot determine a fair day's wage unless it is also prepared to enforce a fair day's work. That the good will of employers cannot be permanently relied upon has been abundantly proved by experience. Public opinion has shown itself equally unreliable.

### Workmen's Organization Regarded Essential

In my opinion the only resource of the workingman is in organization, in his labor unions. These must, by their collective force, protect him in his bargaining with his employer. Their place, under scientific management as before, is to set and maintain a minimum rate of pay and healthful standards of working conditions. The difference is that now they will find their efforts supported instead of opposed by those on the management's side and they will also find impressed upon them their corresponding obligation, to wit: to insist that their members meet the fair day's wage with a fair day's work, as accurately determined.

Labor unions may go far beyond this, however, if they are wise. They may make a scientific management and its benefits their own. They may require employers so to systematize and manage their business that they can afford to pay high wages at the same time they are making higher profits. To get this both sides must co-operate willingly, honestly and effectively with each other. Such co-operation is now, as never before, possible, because it can be based on actual knowledge and on sincerity of purpose. Along this road appears to come the real industrial commonwealth we all desire.

A notable test of a 12-yr.-old Babcock & Wilcox boiler in the plant of the Narragansett Electric Lighting Company, Providence, R. I., has been reported. For 8 hr. nearly 250 per cent. of the rated boiler horse power, at an over-all efficiency of boiler and grate of 73 per cent., was developed. The test was for the purpose of determining the capacity of a Riley self-dumping underfed stoker of five retorts placed under the boiler. A total of 969.2 boiler horse power was developed and the equivalent evaporation per pound of coal as fired figured out at 10.51 lb. The coal heating value was 13,957 B.t.u. as fired.

Since the announcement in *The Iron Age* several weeks ago that the H. W. Johns-Manville Company had secured a site at Riverdale, Ill., on which a large plant was to be erected, various reports of a similar nature have appeared naming Joliet, Elgin, and other places as the location. The final closing of the contract confirms the original announcement and the construction work has been inaugurated.

\*Abstract of a paper read before the Western Economic Society, Chicago, March 15.

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# Time Study and Task Work Explained\*

## What Time Studies Attempt to Establish Commonly Misunderstood—Setting Wage Rate a Late Operation in Introducing Scientific Management

BY SANFORD E. THOMPSON†

The primary object of scientific methods of management is to increase the productive capacity of a man or of a machine to reduce eventually the cost of the product to the consumer and at the same time to increase the remuneration of the worker. This must be accomplished not by mere speeding up. It must be done by so arranging the work of the man as to eliminate the unnecessary operation and the waste time and teach him to perform each necessary operation in the best manner possible. It must be done by standardizing the running of the machine so as to fit each one, as regards speed, accuracy and constancy of operation, for the particular work it has to do.

The primary defect in the common types of management, however comprehensive they may be as regards organization, lies in the lack of application of scientific methods—the lack of methods which start at the bottom and thoroughly study each element in the process and then finally adopt a comprehensive plan of management which will consider all the details and all the processes in the plant to produce one effective working combination, with the functions of each individual definitely designated.

This scientific method, the method of starting at the bottom, analyzing operations and standardizing all implements and machines, is difficult, it is slow, it is costly at the beginning. The problem to consider, then, is whether in the end it will produce permanent results that will pay in the long run better than day work or piece work or the premium plan as commonly employed.

### The Average Unscientific Way of Establishing Piece Rates

Let us contrast for a moment the usual plan of fixing piece rates with the time study method. The foreman and superintendent get together, look over records and compare cost records of past performances, and then guess at the speed at which they think a man ought to do the job. In probably 99 cases out of 100 this guess will be wrong. If the rate is too low the men will fail to earn usual day wages, and a strike is probable. If, as is more apt to be the case, the rates are too high the men soon speed up and earn more than the management thinks they are entitled to. Immediately the rate is cut and the same operation is repeated. After one or two transactions of this kind the men see that it is useless to try to earn a big wage, and when a new rate is set they fix among themselves a definite output per day that will give them the highest wage that the management will pay. This is no mere theory but is almost universal practice in piece-work shops.

How, then, do methods of scientific time study for rate-fixing differ in principle from the ordinary plan of comparing cost records? The taking of records, the finding how long it has taken a man or a woman to do a certain piece of work, is as old as the hills. Records of outputs on the various machines are given in every factory. The obtaining of such records, however, is not time study.

### An Example of Misunderstanding Time Studies

Let us take for an illustration the making and erecting of forms or molds for reinforced concrete buildings—the forms into which the semi-liquid concrete is poured in order to mold it to the proper dimensions for columns, beams and slabs. The cost of forms is ordinarily figured either in terms of per cubic yard of concrete or else in terms of per square foot of surface area. Neither method is accurate. Take one of the simplest processes, the making up of a side for a column form. The side of a column form consists simply of a panel made up of lengths of boards or plank with wooden cleats nailed across them at intervals. The cleats are placed upon the work-bench, the boards or planks are placed across the cleats and nails are driven to fasten the cleats to the boards.

\*Paper substantially in full delivered at the recent conference of the Western Economic Society, Chicago.

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Suppose in one case we have a form or panel for one side of a column 12 in. square. Suppose in another case we have a similar form for a column 24 in. square. How shall we determine the difference in cost? Based on terms of the cubic yards of concrete in the column, the cost of the form for the 24-in. column should be four times as much as for the 12-in. Based on surface area, the cost for the 24-in. should be twice that of the 12-in. As a matter of fact, the time of the 24-in. would be only a little over one-third more than 12 in. for making up, with even a less difference than this for the other operation of setting up and removing. Other parts of the work will be governed by still different ratios, so different, in fact, that it is absolutely impossible to figure accurate costs or set tasks by any system of cost records.

Time study does it in this way. It takes the times of the elementary or unit operations of the man who makes the form. It finds out how long it takes him to place one cleat on the bench. Its finds how long it takes to place the finished form on the pile. It finds how long it takes to put a single board or plank on the bench. It finds out how long it takes him to drive one nail. By taking a lot of observations on each unit and allowing a definite fixed percentage for the necessary rest it is possible from such unit observations as these to determine the time, and therefore the cost, for making up forms of any shape and size. If a certain form has more cleats, the unit time per cleat must simply be multiplied by the extra number. If more individual boards, the time per board by a different number of boards. If more nails, the time per nail by a different number of nails. By such processes as these it has been found possible to make up accurate tables for times and costs of forms of all lengths and sizes and shapes. By the other method of overall times, a separate observation would have had to be made on every different length, width, type and design. Records on one job would have been absolutely worthless for another or even for the same job under different conditions.

### What Time Studies Proved in the Case Noted

The same principles apply to other classes of work in the shop or in construction. Time study not only shows the time in which the work should be done but it also assists in standardizing the methods and the implements. In connection with the making of forms, for example, it was found by time study that a certain type of hammer was better than any other. It was found that a certain method of erecting the forms was considerably cheaper than any other plan. It was found that the number and size of nails, which ordinarily varied with each individual carpenter, could be fixed by definite standards to avoid waste in time and materials. It was found that there were certain methods of handling the lumber which were cheaper than any other way. It was shown by actual figures the saving that could be accomplished by furnishing laborers to do all of the heavy work so that the carpenters could stick to their job of carpentry.

This has been chosen as a typical case. It is always found, even in such simple work as carpentry, when time studies are made and the work is thoroughly analyzed, that processes are improved and waste of time and of material is prevented.

### Original Data of Time Studies Expensive

Such studies are expensive. Yes, this is true, so far as the obtaining of original data is concerned. Remember one thing, however; once the data are obtained, the unit times and the standards are adapted not only for that one piece of work, not only for that one locality, but for all processes, anywhere, involving the units observed. You will doubtless agree with me that ordinary over-all records taken in any one shop are absolutely useless for another shop. In time study work it is entirely different, and we

have instances of data taken in Philadelphia on the manufacture of one type of machinery being used in Boston for the manufacture of an entirely different type of machinery. While the work was entirely different, the same units were used in the processes. The collection of such data, therefore, in the various trades will eventually prove of universal value.

The most important function of time study, as has been implied, is setting tasks or fixing piece rates. Time study is useful also for making more exact estimates. It is useful for standardizing implements and machines. It is useful for arranging a gang of men. In a recent civil service examination for a \$4000 engineering position, one of the questions asked involved the general principle in laying out a gang of men and horses for hauling earth from a bank to a distance of 1000 ft. Out of 17 applicants, less than half appreciated the most elementary principle that the number of men loading carts must be governed by the time required for the carts to make the trip to and from the dump.

#### Universal Application of the Scientifically Obtained Data

I wonder how many men who have given attention to this matter are thinking to themselves, "This is all very well for some kinds of work. It is all right for simple work such as form making, but cannot be done in the work with which I am connected." It is almost amusing, if it were not so serious, to hear some such remark as this repeated over and over again by men in all classes of work with which we come in contact. The most practical answer lies in the fact that time studies have been made and task work or scientific piece work or task work has actually been introduced in so many classes of work that it is possible to state without question that it is of universal application.

Not long ago I attended a conference where the subject of one paper was the limitations of scientific management. The idea was expressed by the writer (who evidently had never come in close contact with the system) that it was applicable to many classes of work, but it was out of the question to apply tasks to the miscellaneous operations in the machine shop. Unfortunately for the reader of the paper, another speaker on the programme was the president of a large machine shop, manufacturing not merely standard tools but making up miscellaneous orders. He stated that in his shop scientific methods of management had prevented failure during the hard times of 1907, had greatly increased output, and at the same time had reduced the number of men.

Experience in scientific methods of management has shown positively not only that quality is not reduced, but that it is improved. As a matter of fact, tasks, if properly handled, provide a means for regulating not merely the quantity but also the quality of output. In many classes of work the saving of material is of much greater importance than the saving of time. In such cases, the worker is paid a bonus not simply for time but for quality. In fact, the largest proportion of the bonus is based on the saving of material.

#### Setting of Tasks About the Last Operation

While time study is one of the fundamental principles involved in scientific management and the other processes of management are centered to a considerable extent around the operation of tasks, in the sequence of the introduction of the new management, the setting of tasks is one of the last rather than the first of the operations to perform.

If a manufacturer wishes to take steps to increase his output, he naturally turns first to the consideration of the speed of the operative. How can I get more work out of my men? How can I determine in a scientific manner the amount of work they ought to do in a given time? How can I set the tasks or piece rates that will be fair? These are ultimate aims of a perfected organization, but instead of indicating the first thing to be done they represent nearly the last. If you begin to set tasks without first getting your machines and your men and your methods of handling your materials into shape you will fail absolutely in accomplishing anything but the most superficial results. It is just here that the scientific method differs most from the rule of thumb method.

The planning of work is necessary in order that time shall not be wasted by the workers in ineffective effort.

The routing must be carried a high degree of excellence in order to distribute the materials properly and permit the setting of individual tasks. The worker must be trained to accomplish properly his task.

Turning to the matter of time study when the plant is ready for it, the first thing that must be done, having obtained the necessary stop watch and blanks for recording observations, is to analyze the operations. A decision must be made as to the element or units into which each operation must be divided. In the case of form making, for example, the units were placing cleat, placing board, driving nail, placing form on pile, together with certain others of less importance not mentioned. The sequence of operations must be determined so that the times can be readily entered. The time study man must really learn each trade he observes. Preferably he should be chosen from the plant organization, since it is of much advantage for him to be familiar with the processes. On the other hand a really expert time study man, because of his power of analysis and of seeing the operations that are taking place, can handle any kind of work and in a very short time will know more of details than the manufacturer himself, simply because it is his job to watch each individual operation.

Standardization of implements and machines must proceed hand in hand with the time study. For example, even in such simple work as handling earth, the proper capacity of the cart of a wheelbarrow must be determined, the size of shovel fixed, and so on. As a matter of fact, this standardization even in simple matters is much more intricate than one would think.

#### Securing the Time Study Information

With regard to the process to be followed in observations, the actual time study is best made by taking a record of every operation which a man performs, including not merely the effective work, but the ineffective work and the lost time. The stop watch is started, and the time he completes every operation, including the ineffective ones, is noted on the note sheets. Then, afterwards, the results are studied and the operations tabulated and analyzed to see how long it takes to do the individual elements.

In making time study, the selection of the operative to observe is a very important point. Always select the best workers on the job for your principal observations. Even if the supply of labor is so small that it is impossible to limit the employment in a particular branch, to men or women who are first-class operatives, relegating the others to some of the places which they are better fitted to fill, the best workers should be selected because they work steadier and their operations are more uniform. Also, the best workers are apt to use the best methods of doing the work and will adopt new suggestions more readily. Observations taken on the best workers do not necessarily mean that these times can be used only for this class. A percentage has to be added to the net times in any case. By properly adjusting this percentage, the rates may be applied either to average workers working at a fair speed or to first-class workers. It is usually a good plan to give the operative you observe a special incentive, such as an addition of 50 per cent. to his or her pay on the day of the observation as a reward for the trouble you are making them.

Having obtained the time of each of the units or elements by a large number of observations on the operatives selected, we are ready to make combinations of these unit times, so as to obtain the total required time for any operation containing these units. It is frequently convenient to make these combinations by means of a simple formula. For example, taking the making up of the side of a column form, which has already been described, if we let

$$\begin{aligned} c &= \text{time placing cleat} \\ b &= \text{time placing board} \\ n &= \text{time driving nail} \\ p &= \text{time lifting pile} \end{aligned}$$

then assuming 6 cleats, 2 boards and 24 nails, the formula would be

$$6c + 2b + 24n + p$$

If seven cleats are used, the 6 in the first term would be changed to 7; if three boards are used, the 2b would be changed to 3b, and so on. In practice when task work is really started, these formulas are used to make up permanent tables, showing the total times for all the combinations that are apt to occur.

### Determining on Wage Rates

A percentage always must be added to the observed times before using them to set tasks, to provide for necessary lost time and delay occurring throughout the day. In certain kinds of work 30 per cent. is a correct value for this. The per cent. to add is governed by the character of the work and whether machine or hand labor. To fix the length of the task the time thus obtained may now be used directly. If the operative accomplishes the task in this time, he is given his regular day wage for the period plus a substantial bonus. If he does not complete it in the given time, he receives his regular pay without the bonus. If the data are to be used for setting scientific piece rates or premiums, the plan to be followed is somewhat different but the general principle is the same.

In determining the amount of bonus, bear in mind a fundamental law of Mr. Taylor's, that a man will not do a maximum day's work for an ordinary day's pay. In order to work at the best speed consistent with physical well being, an operative must receive from 25 to 75 per cent. higher pay than his ordinary day wages. To provide for required quality of the work, it is necessary, as I have already said, to adjust the bonus so that a man's payment will depend not simply on output, but also on the quality of the product or the amount of material used.

In starting any form of piece work or task work, an essential is to begin with one operative. Get this one well started and making his or her bonus, before setting another to work. If a number of workers are started at the same time, one or more of them are certain to fall down and fail to accomplish their task in the set time. This immediately gives an opportunity for dissatisfaction. The man or woman selected for the start should be one of the best in the department. He or she should be especially instructed just how to do the work, so that there can be no possible delay in handling the materials, and so that the operation will be accomplished with the fewest motions and by the best methods.

In beginning tasks on a certain line of work, it is frequently advisable to give a longer time than will be adopted permanently, provided, however, it is clearly stated to the operatives that this is simply temporary so as to enable them to become accustomed to the new methods and provided it is also clearly stated that at a certain fixed period the rates will be changed to new definitely stated figures. These permanent figures must be given out before tasks are begun. Never change this regular rate unless radical changes in methods or machinery are made by the management which reduce the amount of labor.

As illustrations of the operation of task and bonus in practice, I may refer to one case of hand labor for girl operatives without machinery, where the reduction in cost averaged about 50 per cent. during the first year after installation, while the girls accomplishing their tasks earned 40 per cent. more than previously. In another case of two men operating a machine, the reduction in cost was about 35 per cent., notwithstanding a wage increase for tasks accomplished of 40 per cent.

In many classes of machine work, the increase in output is very large because of the standardization of the machine. In certain government work, for example, the increase in output was over  $2\frac{1}{2}$  times. In certain cases of which we have record, not merely was the labor cost substantially reduced, but the cost of material was reduced even as much as one-half, due chiefly to the thorough planning and routing of the materials for each piece of work.

### Saving Obtained Not by Mere Speeding Up

In considering such increase in output and reduction in cost as these, it must be borne in mind very distinctly that this saving is not accomplished by mere speeding up. In form making, for example, it is due in large measure to the use of unskilled in place of skilled labor for handling the materials; to the layout of each form by sketches carefully prepared and lettered; to the use of proper tools; and to the arrangement of benches so as to make it as easy as possible for the men to do their work. It is such savings as these that reduce costs of production in a fundamental way, that benefit the working man through increase of wages and reducing bother and friction. Such savings truly effect the economic production of wealth and must result in reducing costs to the consumer.

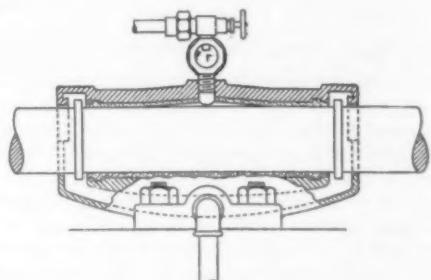
### Economic Use of Lubricating Oils

#### Piping Oils to Bearings and Filtering It for Re-use

From a paper read a few months ago before the National Association of Cotton Manufacturers by David A. Corey, of S. F. Bowser & Co., Inc., Fort Wayne, Ind., has been taken the following:

An important phase in oil and manufacturing economy when the character of machinery renders possible the necessary equipment is the re-use of oil. To re-use oil it must necessarily have all impurities that will cause damage removed, else the re-use will result in actual loss. In many plants the oil used is caught and again used on rough work where the impurities will do no appreciable damage.

In the case of ring-oil bearings, as the impurities increase in quantity, they retard the flow of oil; and if the



Design for Stream-Fed Shaft Bearing

oil is not drawn off and the bearings cleaned out it will cause serious cutting in the journals. This cutting may not be very plainly manifested, the operator being more than likely to look upon the excessive wear as natural wear, while in fact it is due entirely to dirty oil. Ordinarily 200 times as much oil can be fed upon the journals of an engine as would be the minimum amount possible. The use of stream-fed well filtered oil is always possible and profitable in any engine room, paying ordinarily from 50 to 100 per cent. yearly return on the investment.

The bearing shown in the figure is one especially suited for stream feed and drips to be drained away. The oil runs off the bearing and cannot be returned to it until it has passed through a filter and such impurities as would injure the journal removed. The collar on the end of the journal prevents the oil from creeping along the shaft. This form is as safe against shutdown as any system that can be devised.

Another method of increasing the efficiency of ring, collar and chain-oiled bearings is to wash out the bearings occasionally and supply them with clean oil. This is more troublesome and not so efficient as the pipe system, but it is probably the most efficient arrangement used at present for shafting, motors and the like.

By observation and comparison of the power required to drive a line of shafting and the idle running machines, first with clean and then with dirty oil, and knowing the length of time this loss was endured, it can be readily determined whether it pays to change oil every month or oftener. If the saving in power alone is equal to the labor cost it would be justified, as all other savings would be clear gain. But for heavily loaded troublesome drives, some arrangement of flooded lubrication should be provided. If they cannot be connected to a central oiling system, then one must provide an individual system with possibly a rotary pump run by the machine.

The common method of distribution in mills is by means of tanks of 10 to 60 gal. capacity in the different departments, the sizes depending upon the judgment of the management. Small tanks can be removed for filling at a storage house outside, and are more conveniently located for the operators. Another method and one which is being largely adopted for certain factory uses, which does away with transportation about the plant, is by means of long distance pumps operated by hand or power, located at convenient points about the factory and drawing the oil from one central storage point. The advantages of this system are manifest especially where large quantities of oil are used in manufacturing operations, and measurement of the quantity delivered is desired.

## Contract Machine Shop Sales Advantages

Mistake to Equip a Factory to Make a New Article Before It Has a Market

BY G. D. CRAIN, JR.

Attention was recently called in an editorial in *The Iron Age* to the rising importance of the contract machine shop and to the fact that it is regaining the place in the business which it occupied a generation ago. Most of the considerations suggested pertained to the strictly manufacturing questions involved. As a matter of fact, however, the *raison d'être* of the machine shop manufacturing under contract is found chiefly in the advantages accruing to its customers from the standpoint of selling. This is perhaps so obvious that it does not require a great amount of elucidation; yet it is worth noting that mistakes are occasionally made as a result of failure to see that the chief problem of the man with something new to make and market pertains to sales rather than manufacture. That being the case, it is the part of wisdom for him to devote his time, his thought, his capital and his energy to creating a place for his wares rather than merely producing them.

### An Example of a Wise Decision

For example, a concern in an Ohio Valley city recently developed an idea for an automobile specialty. The proposition looked exceedingly good, inasmuch as it was a device, the usefulness of which was calculated to appeal readily to the automobile owner, while the saving which it would probably effect would make it possible to charge a price carrying a handsome profit. There appeared to be little competition for it, so that the field was particularly inviting. The first question to be decided was whether the firm should make the device in its own shops or contract for its manufacture by some one already equipped for such work. The objection to the latter plan by the younger partner was that there was no reason why they should permit somebody else to make money on the manufacture of the article when it was their own product and they were entitled to all the profits which its production entailed.

"But," pointed out the older and wiser member of the firm, "you understand that while we have a mighty good proposition, which I believe in heart and soul and am willing to work my head off for, it is going to take money to get it started. We have a rather modest amount available for this work; and if we go ahead and put in the necessary plant and either supervise its operations personally or employ a foreman or superintendent to do so, we shall surely have less time and money to devote to the sale of the goods. And while we have something which is likely to appeal to a great many people, it is entirely new and we have got to do a great deal of educational work. We shall have to make trips to leading distributors, arrange for advertising, discuss sale prices, demonstrate at the shows and do a thousand other things before we win a place for our product in the automobile market. Hence it seems to me that it would be extremely undesirable to handicap ourselves at the really important end of the business by creating a special shop with the infinite number of practical manufacturing problems to be constantly attended to."

The other saw the point, after this rather convincing explanation, and the contract was accordingly let to a brass-working establishment well equipped to do work on a large scale, having the best machinery obtainable and being in a position, as a matter of fact, to turn out the device more cheaply than its owners could have done for themselves. They have since been concentrating their efforts on sales, and have been making good with the marketing of the article, while it is a question whether they could have done both successfully.

Another firm of young men has scored a really remarkable success in marketing a line of flour mill machinery. They have several patented machines which are efficient in operation, but they saw at the outset that they would have plenty of hard competition, and that they would need all their resources to stem the tide and win business away from their older and better-known rivals. Consequently they looked around for a machine shop which was in a position to take a contract for their work, and found one into which their proposition fitted nicely. They

have been devoting all their time to sales, letting the machine shop proprietor wrestle with the every-day problems of manufacture, and the result is that while the latter is making a normal profit on the goods he is making for them, they are reaping a harvest through sales of their machines which could not have been made had a lion's share of attention been given to shopwork.

A railroad official, engaged for years in operating work, originated several ideas for road construction which were patentable, and found that he had created a business which warranted him in relinquishing his position. He was a practical man, and could probably have operated a shop to advantage, regarding it solely as a manufacturing proposition; but he determined, after looking at the situation from several angles, that he would have plenty to do in seeing the master mechanics and railroad engineers, convincing them of the desirability and value of his devices and getting them adopted, without worrying about turning out the goods. So he has opened an office devoted simply to selling and has given a contracting machine shop an opportunity to expand its business materially through turning out his line.

### A Factory Equipped Too Soon

An example of the opposite policy is found in a firm of young men, two brothers, who designed a motor truck body much out of the ordinary. It was arranged with special regard to dumping. The design and construction of the truck were excellent, and the brothers were confident in their belief that they had a most valuable article. They already had a small shop for doing repair work in connection with a retail automobile business. They decided that they would use this as the nucleus of their "factory," and that they would put in all their energies on building trucks, disposing of their automobile sales agency. They bought a few more tools for the shop, employed additional men and started in.

In their first enthusiasm they did little advertising among those to whom the special body was likely to appeal and actually developed some interest and inquiries. They were forced to reply, however, that they had completed but one machine, which was being used as a demonstrator, but that they hoped to have other trucks to offer later in the year. Work went slowly, and by the time they had completed one or two of the cars, having made nearly every part in their own shop, interest on the part of the prospects had cooled and they had a hard time disposing of the cars which they had to offer, finally selling them at a price which did not carry much profit. The manufacturers then realized that they had committed the mistake of concentrating on making, when selling represented the larger problem; and they looked around for additional capital. Thus they lost valuable time and strained their resources, while possessing a proposition which could have been expanded into a splendid business under proper conditions.

The advantages of the method of letting some other party attend to manufacturing are emphasized by reason of the fact that the cost of an article is known in advance under the contract plan, whereas the man who is making his product in his own shop can never be certain that the cost will not run over an estimate. Especially is this true in a new establishment, where overhead expense seems to be out of all proportion to the work accomplished. The knowledge that all goods sold are sure to show a profit to the owner of the line is mighty comforting to the head of the business, especially if he has had the experience of finding that while he had succeeded in placing his output without much trouble, he had failed to make his manufacturing operations show a profit. The concern which starts with limited capital and a new offering, which requires pushing, exploitation and positive effort, and cannot be listed as a staple, is sure to find its problems tremendously simplified by using the facilities of the contract shop.

The Joliet Bridge & Iron Company, Joliet, Ill., whose operations have been crippled by restricted working capital during a period antedating the death of its former president, Mr. Morrison, is seeking to effect a reorganization under the direction of a creditors' committee. The plant is being operated and will complete the contracts on its books.

# Use of Cold Coke-Oven Gas in Steel Production

## Advantages Developed in Recent Open Hearth Practice in Germany—Loss of Calorific Value in Preheating—Changes in Construction

Prof. Oscar Simmersbach, Breslau, Germany, discusses in *Stahl und Eisen* various phases of the use of cold coke-oven gas in steel production. His position is that coke-oven gas is advantageously applicable to the production of steel in open-hearth furnaces without pre-heating and that the pre-heating of this gas is attended with a loss in efficiency. The writer shows first that ordinary producer gas differs but little in its composition before and after pre-heating, with a loss of only about 4 per cent. in calorific value; that a mixture of coke-oven gas and blast-furnace gas loses about 13 per cent. in heat value by pre-heating. Experiments with coke-oven gas alone, at one of the large German works, showed a loss in calorific value by pre-heating of from 13 to 27 per cent. The decomposition commences usually at about 700 deg. C., as shown by the following tables based on the experiments at the Friedenshütte in Upper Silesia:

Table 1.—Coke-Oven Gas Analysis.

Heating temperature Test. deg. C.	Gas before heating.							Experiments.	
	CO <sub>2</sub> Vol. %	C <sub>6</sub> H <sub>6</sub> Vol. %	O <sub>2</sub> Vol. %	CO Vol. %	H <sub>2</sub> Vol. %	CH <sub>4</sub> Vol. %	N <sub>2</sub> Vol. %		
1	5.0	1.6	0.6	10.8	49.2	21.3	11.5	1	2
2	5.0	1.4	0.4	11.2	43.8	24.6	13.6	75 per cent.	78 per cent.
3	4.4	0.8	1.2	11.4	54.7	16.4	11.1	50 per cent.	129 per cent.
4	4.0	1.4	1.2	11.4	54.8	16.4	10.8	77 per cent.	83 per cent.
5	5.2	1.4	1.0	11.0	48.8	19.5	13.1	100 per cent.	100 per cent.
6	5.6	1.4	0.6	10.0	45.0	19.8	17.6	100 per cent.	100 per cent.
Gas after heating.									
1... 750—760	4.0	0.8	0.6	12.6	50.2	20.5	11.3		
2... 800	3.0	0.3	0.4	13.3	45.2	23.2	14.6		
3... 900—940	3.0	0	0	14.8	58.6	11.4	12.2		
4... 900—940	1.6	0	0	20.0	58.5	7.8	12.1		
5... 1000—1040	1.2	0	0	19.8	52.6	12.6	13.8		
6... 1000—1060	0.4	0	0	19.2	60.0	4.8	15.6		

### Changes in Gas at Varying Temperatures

By heating coke-oven gas from 1000 deg. to 1060 deg. C., or the temperature of the pre-heated gas in most open-hearth practice, there would be a loss in calorific value of about 24 per cent. Since in these investigations different coke-oven gases were used for the various temperatures, rendering a satisfactory comparison impossible, further experiments in the decomposition of coke-oven gas were made by conducting the gas over heated fire-clay at increasing temperatures. The results of these two trials are shown in Tables 2 and 3:

Table 2.—Change in the Composition of the Gas in Per Cent. by Volume.

Composition of the gas before heating.	Temp. deg. C. 810	900	1010	1100	1210		
						1	2
						CO <sub>2</sub> . . . . .	58.8% 56.8%
						C <sub>6</sub> H <sub>6</sub> . . . . .	23.3% 23.7%
						C <sub>2</sub> H <sub>4</sub> . . . . .	9.0% 9.8%
						O <sub>2</sub> . . . . .	Heat value . . . . .
						CO . . . . .	4669 4661 cal.
							Specific gravity . . . . .
3.4	CO <sub>2</sub>	2.6	2.5	1.1	0.6	1.3%	1.2%
0.7	O <sub>2</sub>	0.5	0.4	0.3	0.2	CH <sub>4</sub>	0.4%
7.9	CO	8.1	8.7	9.0	11.2	N <sub>2</sub>	0.4%
2.6	C <sub>6</sub> H <sub>6</sub>	2.2	0.8	0.2	0.0	Heat value	4669 4661 cal.
31.7	CH <sub>4</sub>	28.9	25.1	24.8	16.0	Specific gravity	0.36 0.36
42.8	H <sub>2</sub>	49.3	54.6	57.1	65.1		

Table 3.—Changes in the Composition of the Gas in Per Cent. by Volume.

Composition of the gas before heating.	Temp. deg. C. 800	900	1000	1100	1220		
						1	2
						CO <sub>2</sub> . . . . .	58.8% 56.8%
						C <sub>6</sub> H <sub>6</sub> . . . . .	23.3% 23.7%
						C <sub>2</sub> H <sub>4</sub> . . . . .	9.0% 9.8%
						O <sub>2</sub> . . . . .	Heat value . . . . .
						CO . . . . .	4669 4661 cal.
							Specific gravity . . . . .
3.4	CO <sub>2</sub>	2.1	1.3	1.0	0.7	1.3%	1.2%
0.9	O <sub>2</sub>	0.5	0.3	0.2	0.1	CH <sub>4</sub>	0.4%
6.3	CO	11.0	12.0	12.9	13.5	N <sub>2</sub>	0.4%
2.7	C <sub>6</sub> H <sub>6</sub>	2.0	0.2	0.1	0.0	Heat value	4669 4661 cal.
33.2	CH <sub>4</sub>	27.6	20.2	17.3	15.6	Specific gravity	0.36 0.36
42.6	H <sub>2</sub>	48.6	58.8	63.7	66.1		

The loss in calorific value is shown by the following approximate figures:

At 800 deg. C., a loss of 2 to 6 per cent.

At 900 deg. C., a loss of 6 to 13 per cent.

At 1000 deg. C., a loss of 3 to 7 per cent.

At 1100 deg. C., a loss of 2 to 9 per cent.

At 1200 deg. C., a loss of 14 per cent.

And in one experiment a loss of 33 per cent. was detected at 1200 deg. C.

A closer inspection of Tables 2 and 3 as to the change in the composition of the gas at 1200 deg. C. reveals the following facts:

	1	2
Increase in hydrogen . . . . .	75 per cent.	78 per cent.
Increase in carbon monoxide . . . . .	50 per cent.	129 per cent.
Decrease in methane . . . . .	77 per cent.	83 per cent.
Decrease in carbon dioxide . . . . .	100 per cent.	100 per cent.
Decrease in heavy hydrocarbons . . . . .	100 per cent.	100 per cent.

The vital feature in the reactions which take place in heating coke-oven gas is the decomposition of the hydrocarbons. In any case the variations in the composition of the gas and the losses in calorific value are explained principally by the varied effects of the different constituents on one another.

### Losses in Calorific Value and Otherwise

From the foregoing, the author says, it can be safely concluded that if the regenerative chambers in the open-hearth furnaces of to-day be used for heating coke-oven gases, there will ensue a loss in calorific value of one-fourth to one-third. It naturally follows that with a loss in heat units there goes an increase in volume of the gas and with this, in open-hearth furnaces, an augmentation of the velocity, whereby the combustion takes place in the top of the chambers rather than in the furnace proper. There is also an increase in the nitrogen content out of proportion to the volume of the gas, because of the non-imperviousness of the chambers, as shown by Table 1.

### Results from Cold Gas—An American Example

Two cases of the application of the gas in the cold state at German plants are cited. One is in a reverberatory furnace, where excellent results are secured; the other refers to a basic open-hearth furnace of 12½ tons capacity. In this case, by the use of cold coke-oven gas, the daily production of the furnace increased from 39 tons, where producer gas was used, to 49 tons for the coke-oven gas, or over 25 per cent.

"In America," the author says, "use has already been made of the advantages of the heating value of coke-oven gas in steel works. In my trip of investigation in the fall of last year I saw a 40-ton and an 85-ton open-hearth furnace for the production of steel near Chicago, in which cold coke-oven gas was used. The composition of the gas in the two cases was as follows:

	1	2
CO <sub>2</sub> . . . . .	1.3%	1.2%
C <sub>6</sub> H <sub>6</sub> . . . . .	2.1%	2.4%
C <sub>2</sub> H <sub>4</sub> . . . . .	0.4%	0.4%
O <sub>2</sub> . . . . .	5.6%	5.5%
CO . . . . .		

"A molten charge of 57 per cent. is used and the time of charging is 10 per cent. less than where producer gas is used, although they use the same drafts for gas and air and naturally the amount of air is not suitable for coke-oven gas. They figure that, with new and proper furnace construction, there will be a gas consumption of 300 cu. m. of 4000 calories per ton of steel and an increase in production of 15 per cent."

### Reasons for the Advantages Claimed

The results of operations to date justify the conclusion that in the case of large furnaces of proper construction the consumption of coke-oven gas per ton of steel will amount to not more than 225 cu. m., possibly to only 200, special consideration being given to the fact that with producer gas the coal consumption per ton of steel depends on the uniform flow of gas, a condition which is certain with coke-oven gas. "The low consumption of coke-oven gas," it is pointed out, "is primarily caused by the fact that the flame temperature attained exceeds that resulting from the use of producer gas by 100 deg. C. and more. As a result of this less time is necessary to melt the charge, and also more important still, less time is required to reduce the iron; for on the one hand in the first

part of the charge the bath is mixed better, because with the higher temperature of the bath the effort of the carbon to unite with the oxygen increases, and on the other hand because the transmission of the heat of the hotter flame is more effective."

Professor Simmersbach takes up the question of heat transmission further by showing that the composition of producer gas cannot easily be regulated, while that of coke-oven gas can without delay, so that there ensues a saving of time and a lowering of gas consumption, in cases where the absorption of heat varies during charging, and with each gain in time there results a consequent reduction of loss through radiation and heating.

#### Better Heat Distribution

A further advantage possessed by the cold coke-oven gas over the heated aside from the loss of calorific value in the latter is the following: In open-hearth furnaces a flame should be produced having great radiating value, in order to heat not only by means of contact but also by radiating on the bath and the furnace walls. For this purpose free carbon is necessary. In the cold coke-oven gas there exist many particles of free carbon resulting from the dissociation of the hydrocarbons which raise the temperature of the flame and give forth much light and heat, so that there follows a better distribution of heat in the bath; also the separated carbon provides for the formation of a flame in the second half of the combustion chamber, having greater heating value. This is of considerable importance, because in the modern open-hearth furnaces up to 100 tons capacity, built in Germany to-day with a hearth 12 meters long, the charge must naturally be brought to a boil uniformly on the long hearth.

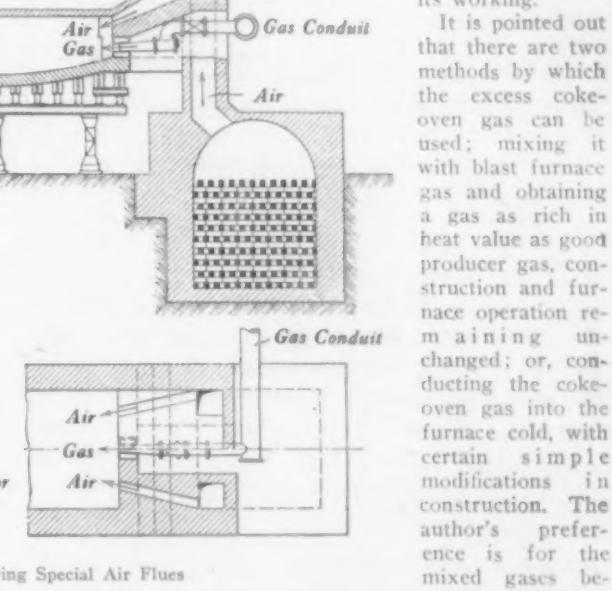
Another advantage in favor of the cold gas consists in the fact that the more hydrogen in a gas the less visible the flame. Since the coke-oven gas by pre-heating has gained in hydrogen content about 75 per cent., the flame from the cold gas is one longer visible, reaching often to the other end of the bath. Again, in reversing the pre-heated gas there is a loss which does not take place in the use of the cold gas, and there is not so great an arrest of the flame at intervals in the furnace. Still further is the fact that there is not the damage to reversing valves from high gas temperatures, nor the danger from explosions in the chambers and flues. The advantages are similar to those resulting in this country where natural gas is available.

The author disposes of the oft-repeated objection to the high temperature of coke-oven gas by saying that hot air is lighter than cold air and that the greater amount of air necessary to burn coke-oven gas holds back the flame the better from the roof. There is less likely to be as much sulphur absorbed by the steel from this gas.

#### The Location of Air Ports

The principal disadvantage is thus stated: In heating with cold coke-oven gas the products of combustion in the open-hearth furnace of to-day must be carried away by means of the air ports situated near the top of the end of the furnace and not through the gas ports situated just over the bath. This is a very important consideration in the case of the large open-hearth furnaces, which have a hearth length of from 10 to 12 meters, and in which the

products of combustion in the second half of the furnace are diverted from the bath to the roof through these high air passages, so that this part of the bath requires more time and heat than the other part to complete the process. But the cure for this, as shown in the illustration, consists in so constructing the air intakes that instead of being at the top they be put near and to one side of the gas intake. By this means the products of combustion can escape through the lower air passage and the flame will immediately be concentrated on the bath. Also the flame is not led to the roof by the high air exits as in the other construction. Other advantages consist in the complete envelopment of the gas on all sides, resulting in a hot flame, which shortens the time of the heat; in a thorough mixing of gas and air, resulting in a complete combustion in the furnace and not in the flues and checkers; in preventing the gradual retreating of the meeting point of air and gas above the bath, which results in an early wearing away of the furnace and a non-uniformity in its working.



Plan of Furnace Showing Special Air Flues

Wirtz in Müllheim am Ruhr rightly claims, one has the advantage of operating "qualitatively." While, with coke-oven gas or producer gas as a fuel, one can regulate the temperature of a furnace by the addition or abstraction of gas, or "quantitatively," in the use of the mixed gases one operates constantly with blast-furnace gas of uniform quality and can alter the temperature of the furnace by the coke-oven gas valve. In either case there ensues such a reduction in the cost of steel production that the new proposition of applying coke-oven gas to the iron industry makes it possible to start with pig iron and end with finished steel without further use of coal.

The motion picture film shown in the article on page 886 of *The Iron Age* of April 10 is not a reproduction of one taken for the Goldschmidt Thermit Company. Another error in the article, which was entitled "Growing Use of Commercial Motion Pictures," was in stating that the Goldschmidt Thermit Company employed a method of electric welding, when such, of course, is not the case, the thermit process being one in which by the use of pulverized aluminum a chemical reaction resulting in the reduction of iron oxide in a crucible is brought about, the aluminum taking up the oxygen and leaving molten iron which can be tapped from the crucible and used for welding purposes.

Prof. William H. Walker of the Massachusetts Institute of Technology will deliver an illustrated lecture on "The Corrosion of Iron and Steel" on the evening of April 25 before the New York Section of the Society of Chemical Industry, at Rumford Hall, 50 East Forty-first street. On the same evening Maximilian Toch will deliver an illustrated lecture on "Concrete Construction, Old and New."

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## The Ferromanganese Duty

We have already commented on the proposal of the Underwood bill to increase largely the duty on ferromanganese, while heavy reductions are made in all iron and steel products. The answer given to all protests has been that the ferromanganese item has been selected for revenue raising; as ferromanganese is used by all steel makers, the tariff upon it becomes a tax upon the steel industry, though not a heavy one, since the duty reckoned on the imports of the past three years would amount to less than \$1,000,000 a year. A good deal has been made in the discussion of the 15 per cent. ad valorem provision, of the fact that the Steel Corporation is the only domestic producer of ferromanganese and it is argued therefore that the duty becomes a "protection" to a single producer and a tax upon the independent steel companies. As the Steel Corporation consumes the ferromanganese it produces it has no market to be "protected," in the ordinary sense of the term. But it is the one humor of the Underwood bill that the Steel Corporation should be left in a position of advantage by any provision of it, considering what is and has been for two years the Washington attitude toward the corporation; and now that that advantage has been pointed out, it would not be surprising to see the ferromanganese paragraph changed, even to the surrender of the very necessary \$1,000,000 per annum of revenue.

A chief objection to the 15 per cent. duty on ferromanganese is the uncertainty that will constantly exist as to the amount of duty the American steel manufacturer will have to pay. Ferromanganese contracts are made long in advance of the actual use of the material in manufacture. Purchases are often made from English works on which deliveries will not be finished until nine months or more from the time of placing the order. The history of the ferromanganese trade is one of wide fluctuations. At the opening of 1912 the price was about \$40, Baltimore, and by the end of the year it had risen to \$65. Ad valorem duties are assessed on the price prevailing at the time of shipment. Thus a contract might be entered into at, say, \$40 in England, which would mean a duty of \$6; whereas at the time of delivery the price in England might be \$60, calling for a duty of \$9 a ton.

It is to be noted that spiegeleisen, which contains an average of about 20 per cent. manganese as against 80 per cent. in ferromanganese, carries a duty of 8 per cent. under the Underwood bill. As the price of spiegel averages more than half that of ferromanganese, its manganese content is taxed at a higher rate than that of ferromanganese. It appears from the statistics that imports of spiegeleisen have been declining, in 1912 being almost nil. There has been a decline also in the domestic production. As steel production has increased, it is evident that practice in respect to manganese additions has changed at all works to a much larger use of metal of high manganese content.

The statistics below are interesting as showing the increase in domestic ferromanganese production, as well as imports, in line with the expansion of the domestic steel industry. The foreign supply of ferromanganese has not always kept even pace with the domestic demand, and this has resulted at times in rapid advances of price abroad. Such an advance occurred in 1906; another in 1909, and, as indicated above, there was a sharp advance in 1912:

*Production and Imports of Manganese Metals, 1903 to 1912—  
Gross Tons.*

Calendar Year	Production		Imports		Total ferro-manganese equivalent
	Ferro-manganese	Spiegel-eisen	Ferro-manganese	Spiegel-eisen	
1903	35,961	156,700	41,519	122,015	147,159
1904	57,076	162,370	21,813	4,623	120,637
1905	62,186	227,797	52,841	55,457	185,840
1906	55,520	244,980	84,359	103,268	226,941
1907	55,918	283,430	87,400	48,994	226,424
1908	40,642	111,376	44,624	4,579	114,255
1909	82,209	142,831	88,934	16,921	211,081
1910	71,376	153,055	114,228	25,383	230,213
1911	74,482	110,236	80,263	20,970	187,546
1912	125,379	96,346	99,137	1,050	248,865

The table shows that while in the five years ending with 1907 the production of domestic spiegeleisen averaged 215,055 tons, the average in the past five years has been but 122,769 tons. Steel works have found that their blast furnaces could be more economically used in the production of pig iron rather than to be burdened for manganese metal, of which the output is small compared with straight pig iron. The result has been that all independent steel manufacturers, in view of the relatively small amount required by any one of them, have ceased to make forromanganese or spiegeleisen. The Steel Corporation is the sole manufacturer of ferromanganese and the New Jersey Zinc Company is the only other manufacturer of spiegeleisen.

While there have been interruptions at times to the importation of manganese ores to the United States, particularly because of disturbances in the countries surrounding the Caucasus district, India and Brazil are more dependable and are large producers. It is a question whether with a much increased duty on ferromanganese the independent steel companies will turn again to the manufacture of their own manganese metals. Our table shows that the consumption of manganese metals reckoned in the equivalent of ferromanganese (counting four tons of spiegeleisen to one of ferromanganese) has been about one ton to 110 to 130 tons of steel. In 1910, for example, the total production and imports of manganese metals reckoned in terms of ferromanganese was 211,000 tons, while the total steel production was 26,094,000 tons, the ratio being 1 to 124. Last year, with 30,000,000 tons of steel, the ratio was 1 to 120. The proposed increase in duty on \$60 ferromanganese would be \$6.50 a ton over the present specific rate of \$2.50, which would figure out about 5 cents per ton of steel produced.

### Cannon Makers Would Be War Makers

Germany is shaken perhaps to a greater extent than at any time in recent years by the charges against the Krupp company. It is accused of bribing officials in the Government service so as to get early details of armament contracts to be let. The allegation is further made that for a considerable time the growth of war sentiment in Germany and France has been due largely to agitation inspired by agencies of this great steel-making establishment whose growth and achievements have been the pride of the German Empire.

The revelations were first given publicity in the Reichstag by Dr. Liebknecht, who came in possession of information which caused him to make the most serious declaration that the Krupp company was systematically fomenting war sentiment in Germany. This was followed by the publication, April 20, in a German newspaper, of the text of instructions sent by another armament company to its Paris agent, directing him to leave no stone unturned to persuade some popular French newspaper to publish a statement that France intended to double her orders for machine

guns, the object being to impel the German Government to give orders for such guns to the company. Another Berlin paper states that these developments explain how "army and navy societies have sprung up to preach war, with the financial assistance of armor plate firms; how files of pensioned officials have steadily perambulated the country advocating war; how the armor firms have subsidized German newspapers to conduct crazy campaigns of hatred against France and England, and how these same firms sold weapons to the German Government at higher prices than to the nations which these papers were paid to abuse." It winds up with the statement that "the armament factories pay 30 per cent. dividends, but the German taxpayer is treacherously sold."

The "greed for gold" is the expression used to characterize the motives which have actuated the managers of these great German steel companies in thus trying to create a stronger demand for guns and other war equipment. We have seen in this country discreditable exhibitions of perverted salesmanship in the attempt to increase trade. We have heard of bribery of purchasing agents and the corruption of underlings who were presumed to have some power to direct buying. We have also had charges that inferior products or materials of doubtful quality were palmed off on those who believed they were purchasing the best to be had in the market. We have had various other allegations of more or less damaging character against manufacturers of fairly high standing. But never has the charge been made against any of our manufacturers that they sought to embroil their own and other nations in war simply for the sake of increasing the demand for their products. It is little wonder that the German press is outspoken in its denunciation of such a sordid and cold-blooded method of salesmanship.

It is fortunate for the peace of Europe that these revelations have been brought about. The recent increasingly numerous outbreaks of racial hostility are explained to a great extent, and possibly the chief cause has been laid bare. The thought is appalling that if this condition of things had not been discovered the development of international trouble would have proceeded until it culminated in a great war with its fearful carnage. It is possible that out of these revelations may grow a more thorough determination on the part of the various governments of the great nations of the world to ignore petty irritating occurrences and to maintain peace unless the national honor is unmistakably attacked.

### Sound Advice to Strikers

Employees who believe they have a just cause of complaint regarding wages or factory conditions should find food for thought in the report of an Ohio Senate committee that investigated the recent Akron rubber strike. A forcible conclusion of that report is that it is much better for employees to fight their own battles with their employers than to place their cause in the hands of outside labor agitators. When the strike was in progress an investigation of conditions in the Akron rubber factories was authorized by the Ohio Senate, this investigation having the hearty approval of the strikers, and a committee spent some time on the ground inquiring into the alleged grievances. At the inauguration of the strike organizers of the Industrial Workers of the World rushed to Akron and assumed leadership over the strikers.

The Senate committee in its report, which was made a few days ago, after finding that the wages paid by the Akron rubber factories compared favorably with those paid in other industries, has this to say regarding the I. W. W.: "Leaders of the organization of the I. W. W., instead of helping the striking employees of the rubber factories of Akron, did them much injury and are largely responsible for any failure to secure redress for any wrong which may have existed. The I. W. W. organization and its leaders injured rather than helped the men and women who were on strike by preventing them from meeting with their employers to settle differences." The report also refers to sabotage which the I. W. W. attempted to establish in Akron rubber plants in the following language: "We submit that this dangerous doctrine is a matter of grave importance. There can be neither moral nor material improvement for those who labor if they accept the leadership of men who practice and preach such immoral and destructive doctrines. In the last analysis, it is labor which is injured the most."

### The Eastern Steel Company's Earnings

Earnings, both gross and net, of the Eastern Steel Company for 1912 show an increase over 1911. The increase in gross earnings was \$5,308,260 and the net increase \$19,288. The earnings for both years are:

	Gross.	Net.	Bond Interest.	Balance,
1912.....	\$9,155,858	\$465,733	\$121,158	\$344,575
1911.....	3,847,598	446,445	120,686	325,759

The heavy increase in gross for 1912 is due to the acquisition of the Warwick Iron & Steel Company. The gross earnings for 1912 include: Sales of structural shapes, \$4,276,152; of fabricated materials, \$556,778; of pig iron, \$4,299,524; other income, \$23,405.

The annual convention of the United Metal Trades Association of the Pacific Coast was held at Seattle, Wash., last week. The election of officers resulted in the choice of the following: President, A. G. Labbe, Willamette Iron & Steel Works, Portland, Ore.; first vice-president, F. G. Frink, Washington Iron Works, Seattle, Wash.; second vice-president, J. M. Fitzpatrick, Union Iron Works, Spokane, Wash.; third vice-president, Eugene Roberts, Puget Sound Iron & Steel Works, Tacoma, Wash.; treasurer, A. M. Clark, Columbia Steel Co., Portland, Ore. Mr. Labbe, the new president, succeeds John Hartman, Atlas Foundry & Machine Company, Tacoma, Wash.

A so-called five-trunnion hot metal car has been developed by the William B. Pollock Company, Youngstown, Ohio. The use of multiple trunnions provides for turning or pivotal points as the ladle is successively lifted to pouring positions, and the company has prepared for distribution an album of views showing clearly these successive positions and the object of the multiple trunnion construction. A modification of the car has been made, adapting it particularly, for example, for use in delivering molten metal to a pig casting machine.

The National Metal Trades Association is this week removing its offices from the New England Building, Cleveland, Ohio, to rooms 1021 and 1023 Peoples Gas Building, Michigan avenue and Adams street, Chicago, Ill. John D. Hubbard, commissioner, advises that communications should be addressed to the Chicago office after April 23.

The Titanium Alloy Mfg. Company announces that the sale of its products will hereafter be in charge of the general manager, Andrew Thompson, with offices at Niagara Falls, N. Y., and that A. C. Hawley will represent the company in the Pittsburgh district, being located at the company's office in the Oliver Building, Pittsburgh.

### Decision Against Closed Shop Agreements

Closed shop agreements, which make it impossible for non-union men to obtain work in a given community, are held to be illegal conspiracies in a decision handed down April 18 by the Supreme Court of Errors in Connecticut. The decision holds that a non-union craftsman thus debarred from work has the right to maintain a suit for damages against the union which procures his discharge from a closed shop and prevents his employment in other closed shops.

The decision ordered a new trial of a suit for damages brought by Dominick Connors of Yonkers against Patrick Connolly and other officers of the Danbury, Conn., local of the United Hatters of North America. The decision says, in part:

"It needs no argument to demonstrate that any combination between employers and employed which creates a condition in a community such as has been hereinbefore described is a serious menace to the craftsman or workingman who, in the exercise of his free right of choice, does not wish to join a union. It is calculated to place upon his freedom of choice and action a coercion which no longer leaves him wholly free. Its tendency is to expose him to the tyranny of the will of others, and to bring about a monopoly which will exclude what he has to dispose of and other people need from the open market, or perhaps from any market."

The case was prosecuted for Connors by Walter Gordon Merritt, 25 Broad street, New York, and Charles Wells Gross. Mr. Merritt, in commenting on the decision, says that in New York City the building trades present a situation analogous to the hat industry in Danbury. It is now impossible, he said, for a non-union man to obtain any steady work in the construction of new buildings, although non-union men may occasionally get short employment in repair work.

### Steel Corporation Extensions at Duluth and Gary

About \$2,000,000 more than had been planned will be spent upon the new plant of the Minnesota Steel Company at Duluth, Minn., parts of which are now being pushed to completion. An appropriation was voted this week to build three additional open-hearth furnaces, making 10 in all. Additions will be made also to the finishing mills originally contemplated.

Gary will be the scene of further construction work by the Steel Corporation, as was noted some weeks ago. Additional blast furnaces will be built there and ultimately the coke oven plant will be considerably increased.

The use of tar as fuel in open-hearth furnaces is extending among Steel Corporation subsidiaries. Several furnaces in Group 1 at the Gary steel plant have been burning tar for nearly a year. At South Sharon, Pa., one furnace in the open-hearth plant has been for some time using tar, and the results have been so satisfactory, particularly in ability to get high heat, that two more are now being equipped in a similar way.

The companies operating iron mines on the Cayuga Range in Minnesota have replied to the demands recently made by striking miners by saying that they cannot grant them and compete with operators on other ranges. The demands included an 8-hour day, time and one-half for overtime or Sunday work, the abolition of contract work and a minimum wage of \$3 a day for underground work. About 900 men went out on strike.

The Alan Wood Iron & Steel Company has filed a bill of particulars, covering 555 pages, in court at Norristown, Pa., in its suit against the Philadelphia & Reading Railroad. It alleges unlawful discrimination on cars to and from the works, and that the railroad refuses to shift cars to its siding for loading and unloading.

The Barney & Smith Car Company, Dayton, Ohio, has had 1500 men at work for more than two weeks cleaning out its shops, shop streets and offices and it expects to resume normal operation by the latter part of April.

## The Underwood Tariff Bill Attacked

Report by the Protectionist Minority  
Sharply Assails Its Principal Features

WASHINGTON, D. C., April 22.—"The proposed bill seems to meet with universal approval on the other side of the Atlantic" is one of the characterizations of the Underwood tariff bill by Representative Payne, former chairman of the Ways and Means Committee, and now ranking minority member on the committee, in the course of the minority report which he made for himself and associates on Monday.

### Prosperity Under the Present Tariff

Representative Payne says that during a period of 50 years we have had a protective tariff in this country which has built up manufacturing industries not approached by those of any other country, and there has been general prosperity. "Under the present tariff law this universal prosperity has reached the very highest crest," says the report. "Every laborer willing to work is fully employed. Even the poorest class of laborers employed at the lowest wages have still been able to send surplus earnings to their native countries. The present law has demonstrated during the four years of its existence that, in connection with the internal revenue system of taxation, we can collect adequate tariff duties for all the necessities of the Government." The report continues:

"The Democratic majority of the committee has published a handbook in connection with this bill which gives for each year the average ad valorem rate of duty under all tariff bills from 1850 down to and including 1912. This shows that the average ad valorem rate of duty on all imports under the present law for the fiscal year 1912 is 18.58 per cent, lower than during any year of the entire period except the years 1857 to 1860, and much lower than the rate under the Dingley law. Another unanswerable proof of the fact that, taken as a whole, the present law was a substantial revision downward is furnished by two statements from the Treasury Department submitted herewith, one covering the importations for the six months from October 1, 1909, to March 31, 1910, and the other covering the importations for the fiscal year ended June 30, 1911. These statements mark the fact that in the first period the present law shows a reduction in duties of 6.4 per cent, and in the second period 4.05 per cent, from the Dingley law."

### Not a Revenue Tariff

"In presenting this bill the committee is met with a threatened deficit in revenue of about \$100,000,000, which it is compelled to meet by extraordinary methods of taxation used heretofore only in time of war. As a revenue measure the committee at the very outset confesses this bill to be a failure. It would seem as if a party pledged to a revenue tariff would strive to make the revenue feature conspicuous."

"In the brief time that this bill has been permitted to see the light of day there has been little opportunity for the minority of the committee, who saw it first when it was introduced in the House, to study its provisions. It is easily apparent that many of the duties have been placed on articles used by our manufacturers, and imported wholly from abroad, as a 'tax on the manufacturers'; that many duties have been lowered so that they are much less than the difference in the cost of labor at home and abroad; that many articles now paying very low rates of duty have been put on the free list, while the comparative cost of production here and abroad is such that it will be impossible for business to continue without bringing down our scale of wages to the level of the rates paid abroad. In many cases articles are put on the free list, while a protective duty is laid on the material used in their manufacture."

"And yet it would be erroneous to charge that all the rates have been laid with an eye single to revenue only. Some of them carry 'incidental protection' which, on the face of it, shows that 'incidental protection' was planned as a part of the scheme of the framers of the bill. These features are spasmodic and generally have a local coloring."

By "local coloring" Representative Payne refers rather sarcastically to protective rates given to certain products of the South.

### The Ad Valorem System Objectionable

An objection to the ad valorem system, and the one most important, Mr. Payne says, is that it bears more heavily on the honest importer and favors the man who by perjury and fraud undervalues his goods and escapes his fair share of taxation, and he adds that with a single exception every great commercial nation has substituted specific duties wherever practicable. He continues: "The tariff board went into this question very exhaustively in its report on the woolen schedule and made a strong argument in favor of specific duties. This seems to be essentially an ad valorem bill. The manufacturer who may still hope to continue his business without profit under some ad valorem rate imposed by this bill, if such there be, will find in the end that such duty is a delusion and a snare as a measure of protection."

The report calls attention to the fact there is no provision in the bill for a maximum and minimum duty, and hence no hope for the executive to obtain concessions from foreign countries which those same countries allow to our rivals in trade, and adds: "Under the working of the maximum and minimum rates in the present tariff law, these various questions have all been smoothed out by negotiations, and we are getting generally as good terms as any of our competitors in the way of tariff duties and trade regulations. This feature has added much to our export trade which has so rapidly increased during the past four years under the present law."

It is stated that the substitute in the Underwood bill for the maximum and minimum section of the present act, and which authorizes the President to negotiate "trade agreements" with foreign countries, such agreements to be approved by Congress before becoming effective, gives no new power to the President or to Congress, as both have it now, and under it the Cuban and the Canadian reciprocity agreements were negotiated and concluded. The report continues: "The maximum and minimum provision in the present law is now denounced as a club. We have no denunciations from the same sources of similar provisions in European tariffs. By whatever name our provision is called, it cannot be denied that during the past four years it has accomplished the purposes for which it was enacted." In conclusion the report says:

### A Present Full Treasury and Abundant Revenue

"No new administration ever inherited such a full treasury and such abundant revenue as this one. At the close of business on March 3, last, the total balance in the general fund was \$149,335,711.78. Making due allowance for a working balance, we have \$75,000,000 available for any deficit in the revenue to meet future expenditures. Although the revenue from customs has fallen during the month of March because of the threatened tariff reduction, the indications are that the surplus to be added at the end of the present fiscal year, ending June 30, will be at least \$50,000,000. In view of the official Treasury Department statement, all must admit the prosperous condition of our governmental finances. The people of the country have been more prosperous than ever before in our history."

"There is no excuse for the radical change in our revenue system proposed by this bill. The people have not asked for it. The party proposing it is in power, not by the grace of a majority of the American people, but by a division in the ranks of the majority on other questions than that of protection. The administration has the power to enact this legislation. The accounting for the abuse of that power will come later."

The Democratic House caucus on the bill finally approved it on Saturday last, the only important changes being the transferring of shoe machinery to the free list and the taking out of the free list of buckwheat and rye. On Monday Chairman Underwood reintroduced the measure and it was reported back to the House and placed on the calendar. The debate will begin this week, and Mr. Underwood and his lieutenants expect that the bill will pass the House by May 15 at the latest. W. L. C.

The Wigan Coal & Iron Company, Ltd., Wigan, England, has appointed Rogers, Brown & Co. its American representatives for the sale of ferromanganese and spiegel-eisen. The Wigan company has heretofore been represented in this country by Dana & Co., New York.

# The Iron and Metal Markets

## All Markets Are Quieter

### Pig Iron Very Dull and Prices Lower

#### Steel Corporation Still a Buyer of Billets—Structural Deliveries Easier

So much business is on their books, and specifications, though not in such volume as in the first quarter, are still so heavy that steel manufacturers have been quite complacent under the much smaller bookings of new contracts. Buyers are no longer spurred by the probability of higher prices later, and the industry promises to work gradually into a closer connection between mills and consumers.

There is little difference in the amount of strain under which leading mills are working, yet in steel as well as in pig iron earnest consideration is being given in some quarters to the question to what the present quiet conditions will lead. It is recognized that the pig-iron market cannot remain stagnant long, in the increase of uncertainty about general business, without affecting finished lines, even though the two departments of the market have for a good while been out of step.

While pig-iron buyers have waited, prices have worked lower, and the descent in the past two weeks has been rapid, so much so as to furnish buyers fresh reasons for holding off. They are not moved, moreover, by the possibilities of a rebound due to scores of consumers rushing in at once when an attractive level has been reached.

That there is some need of buying for early delivery and that deliveries on contracts have been so large as to reduce stocks in some districts are grounds for the belief expressed by sellers that a buying movement is not far ahead. It is urged also that cost has been closely approached in some recent offers.

The proportion of Southern iron sales at \$12, Birmingham, for No. 2 has increased. Resale Virginia iron has also been a cause of weakness. Some inquiry for export has developed and 6000 tons of Alabama iron has been sold for Europe, mostly on the basis of \$12.60, Birmingham, for No. 2 foundry.

The basic iron bought by an eastern Pennsylvania steel company last week amounted to 40,000 tons, distributed among five furnace companies. Offers of \$16.25 by another buyer, or 25 cents below the basis of the above sales, have been declined.

The Steel Corporation has bought 24,000 tons of open-hearth billets and blooms for shipment to the National Tube Company's Pittsburgh district plants—15,000 tons coming from the East and 9000 tons from a western Pennsylvania steel plant. The prices were close to the \$29 quotation that has been maintained for some time on open-hearth steel. It is probable that the Steel Corporation will be a buyer of semi-finished steel for some months.

Rail orders include 7000 tons for the Atlantic Coast line, 5000 tons for the Baltimore & Ohio and 2000 tons for the St. Paul, taken by the Pennsylvania Steel Company. Of 25,000 tons for the Missouri Pacific and 10,000 tons for the Denver & Rio Grande the greater part was taken by the Colorado mill. There is some good export rail inquiry also from Argentina and the Far East.

The Big Four is taking bids on 7000 tons of bridge steel for the repair of flood losses; but in general structural orders are not pressing. A bridge contract from Japan amounts to 2000 tons. The Seaboard Air Line's car orders were for 1050. The car works can make deliveries in the last quarter, and are now figuring on more than 15,000 cars.

Prices on structural steel indicate that mills are catching up, particularly in the East, where a 1.50c. Pittsburgh basis is reported in one case for delivery in the second quarter.

In the Chicago district 70,000 tons more of bar contracts have just been placed by implement works, deliveries to be made this year. At Pittsburgh little additional has been done in bars by agricultural interests. On the 1.40c. basis bar buyers seem no more willing than sellers have recently been to have contracts run over into 1914.

Some concessions are reported in galvanized sheets. The firmer conditions in this market, due to the flooding of a number of mills, did not last.

Most of the 11,000 tons of cast-iron pipe on which New York City took bids this week was awarded to a contracting firm, which has yet to buy from pipe foundries.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type Declines in Italics

At date, one week, one month, and one year previous.				
	Apr. 23	Apr. 16	Mar. 26	Apr. 24
Pig Iron, Per Gross Ton:	1913.	1913.	1913.	1912.
Foundry No. 2, X, Philadelphia.	\$17.25	\$17.25	\$17.75	\$15.00
Foundry No. 2, Valley furnace	15.25	15.50	16.25	13.25
Foundry No. 2 S'th'n, Cin'ti...	15.25	15.75	16.25	13.75
Foundry No. 2, Birmingham, Ala.	12.00	12.50	13.00	10.50
Foundry No. 2, furnace, Chicago*	16.75	17.00	17.25	14.00
Basic, delivered, eastern Pa....	16.50	16.50	17.50	15.00
Basic, Valley furnace .....	15.75	15.75	16.00	13.00
Bessemer, Pittsburgh .....	17.90	17.90	18.15	15.15
Malleable Bessemer, Chicago**	16.75	17.25	17.25	14.00
Gray forge, Pittsburgh .....	15.65	16.15	16.75	13.65
Lake Superior charcoal, Chicago	18.00	18.00	18.00	15.75

### Billets, etc., Per Gross Ton:

Bessemer billets, Pittsburgh....	28.50	28.50	28.50	20.00
Open-hearth billets, Pittsburgh....	29.00	29.00	29.00	20.00
Forging billets, Pittsburgh ....	36.00	36.00	36.00	27.00
Open-hearth billets, Philadelphia	30.00	30.00	30.00	22.40
Wire rods, Pittsburgh .....	30.00	30.00	30.00	25.00

### Old Material, Per Gross Ton:

Iron rails, Chicago .....	16.00	16.25	16.25	16.00
Iron rails, Philadelphia.....	18.00	18.25	18.00	15.50
Carwheels, Chicago .....	16.75	16.75	16.75	13.50
Carwheels, Philadelphia.....	14.50	15.00	15.00	13.00
Heavy steel scrap, Pittsburgh..	14.00	14.25	14.25	13.25
Heavy steel scrap, Chicago....	12.50	12.50	12.25	11.75
Heavy steel scrap, Philadelphia	13.00	13.50	13.50	13.25

### Finished Iron and Steel,

Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill....	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.57½	1.62½	1.67½	1.27½
Iron bars, Pittsburgh .....	1.70	1.70	1.70	1.20
Iron bars, Chicago .....	1.57½	1.57½	1.57½	1.15
Steel bars, Pittsburgh, future..	1.40	1.40	1.40	1.20
Steel bars, Pittsburgh, prompt..	1.85	1.85	1.85	1.20
Steel bars, New York, future..	1.56	1.56	1.56	1.36
Steel bars, New York, prompt..	2.01	2.01	2.01	1.36
Tank plates, Pittsburgh, future..	1.45	1.45	1.45	1.25
Tank plates, Pittsburgh, prompt	1.70	1.70	1.70	1.25
Tank plates, New York, future	1.61	1.61	1.61	1.41
Tank plates, New York, prompt	1.76	1.76	1.76	1.41
Beams, Pittsburgh, future.....	1.45	1.45	1.45	1.25
Beams, Pittsburgh, prompt....	1.70	1.70	1.70	1.25
Beams, New York, future....	1.61	1.61	1.61	1.36
Beams, New York, prompt....	1.71	1.71	1.76	1.36
Angles, Pittsburgh, future....	1.45	1.45	1.45	1.25
Angles, Pittsburgh, prompt....	1.70	1.70	1.70	1.25
Angles, New York, future....	1.61	1.61	1.61	1.36
Angles, New York, prompt....	1.71	1.71	1.76	1.36
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.12½
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.17½
Steel hoops, Pittsburgh .....	1.60	1.60	1.60	1.25

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

	Apr. 23, Apr. 16, Mar. 26, Apr. 24,			
Sheets, Nails and Wire,	1913.	1913.	1913.	1912.
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.35	2.35	2.35	1.90
Wire nails, Pittsburgh	1.80	1.80	1.80	1.60
Barb nails, f.o.b. Eastern mills	1.80	1.80	1.80	..
Barb nails, Pittsburgh	1.70	1.70	1.70	1.55
Barb wire, ann'd, to 9, Pgh.	1.60	1.60	1.60	1.40
Barb wire, galv., Pittsburgh	2.20	2.20	2.20	1.90

**Coke, Connellsburg, Per Net Ton, at Oven:**

	Apr. 23,	Apr. 16,	Mar. 26,	Apr. 24,
Furnace coke, prompt shipment	\$2.25	\$2.25	\$2.30	\$2.60
Furnace coke, future delivery	2.25	2.25	2.50	2.25
Foundry coke, prompt shipment	3.00	3.00	3.00	2.75
Foundry coke, future delivery	3.00	3.00	3.00	2.65

**Metals,**

	Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	15.75	15.75	15.00	16.00	
Electrolytic copper, New York	<b>15.62 1/2</b>	15.50	14.87 1/2	15.87 1/2	
Spelter, St. Louis	5.45	5.60	6.05	6.85	
Spelter, New York	5.60	5.75	6.20	7.00	
Lead, St. Louis	<b>4.37 1/2</b>	4.20	4.20	4.12 1/2	
Lead, New York	<b>4.50</b>	4.35	4.35	4.20	
Tin, New York	<b>49.75</b>	49.50	46.75	44.75	
Antimony, Hallett, New York	8.50	8.50	8.50	7.75	
Tin plate, 100-lb. box, Pittsburgh	\$3.60	\$3.60	\$3.60	\$3.30	

**Finished Iron and Steel f. o. b. Pittsburgh**

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22 1/2c.; Kansas City, 42 1/2c.; Omaha, 42 1/2c.; St. Paul, 32c.; Denver, 84 1/2c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.45c. to 1.70c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under 1/4 in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.45c. to 1.70c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

**Wire Rods and Wire.**—Bessemer, open-hearth and chain rods, \$30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.60; galvanized, \$2. Galvanized barb wire, to jobbers, \$2.20; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Nos.	0 to 9	10	11	12	12 1/2	13	14	15	16
Annealed	\$1.75	\$1.80	\$1.85	\$1.90	\$2.00	\$2.10	\$2.20	\$2.30	\$2.30
Galvanized	2.15	2.20	2.25	2.30	2.40	2.50	2.90	3.00	

**Wrought Pipe.**—The following are the jobbers' car-load discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from April 12, 1913, iron pipe (full weight), from October 21, 1912:

Butt Weld.				
Steel.	Black.	Galv.	Iron.	Black.
1/8, 1/4 and 3/8	72 1/2	52	1/8 and 1/4	67
1/2	76 1/2	66	1/2	66
9/16 to 3	79 1/2	71	9/16 to 2 1/2	70
			1/4 to 2 1/2	73
				62

Lap Weld.				
Steel.	Black.	Galv.	Iron.	Black.
2	76 1/2	68	1 1/4	57
2 1/2 to 6	78 1/2	70	1 1/2	68
7 to 12	75 1/2	65	2	69
13 to 15	52 1/2	..	2 1/2 to 4	71
			4 1/2 to 6	62
			7 to 12	69
				56

**Plugged and Reamed.**

1 to 3, butt	77 1/2	69	1 to 1 1/2, butt	71	60
2, lap	74 1/2	66	2, butt	72	61
2 1/2 to 4, lap	76 1/2	68	1 1/4, lap	55	44

**Butt Weld, extra strong, plain ends.**

1/8, 1/4 and 3/8	67 1/2	57	1/8	64	53
1/2	72 1/2	66	1/2	68	61
3/4 to 1 1/2	76 1/2	70	3/4 to 1 1/2	72	63

**Lap Weld, extra strong, plain ends.**

2	73 1/2	65	1 1/2	66	60
2 1/2 to 4	75 1/2	67	2	67	59
4 1/2 to 6	74 1/2	66	2 1/2 to 4	71	62
7 to 8	67 1/2	57	4 1/2 to 6	70	61
9 to 12	62 1/2	52	7 and 8	64	54
			9 to 12	59	48

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Boiler Tubes.**—Discounts to jobbers, in carloads on lap-welded steel, in effect from February 1, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.	Standard Charcoal Iron.
1 1/8 and 2 in.	60
2 1/2 in.	57
2 1/2 to 3 1/4 in.	63
3 and 3 1/4 in.	68
3 1/2 to 4 1/2 in.	70
5 and 6 in.	63
7 to 13 in.	60

Locomotive and steamship special grades bring higher prices.

Nos. 3 to 8	1.70
Nos. 9 and 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.95

**Box Annealed Sheets, Cold Rolled.**

Nos. 10 and 11	2.00
No. 12	2.00
Nos. 13 and 14	2.05
Nos. 15 and 16	2.10
Nos. 17 to 21	2.15
Nos. 22 and 24	2.20
Nos. 23 and 26	2.25
No. 27	2.30
No. 28	2.35
No. 29	2.40
No. 30	2.50

*Galvanized Sheets of Black Sheet Gauge.*

	Cents per lb.
Nos. 10 and 11	2.50
No. 12	2.60
Nos. 13 and 14	2.60
Nos. 15 and 16	2.75
Nos. 17 to 21	2.90
Nos. 22 and 24	3.05
Nos. 25 and 26	3.20
No. 27	3.35
No. 28	3.50
No. 29	3.65
No. 30	3.80

**Pittsburgh**

PITTSBURGH, PA., April 22, 1913.

With respect to the booking of new contracts, the finished steel trade shows a condition bordering on stagnation. With respect to specifications against old contracts, there is a slight decrease as compared with a fortnight ago, and a greater decrease as compared with 30 days ago, but with respect to the insistence of buyers for deliveries there is no let-up whatever. Prices are being maintained firmly all along the line with few exceptions, the most noted exception being galvanized sheets, but the slight concessions named by a few mills are above prices realized on current shipments, which are being made against old contracts. Steel-pipe prices as advanced 10 days ago are being strictly maintained, so that this market is steadier than it was. The large amount of business reported in the past few months as existing in the form of actual specifications on mill books remains, there being no revision of the estimates now that the market as a whole has passed into a quieter period. The steel mills confidently expect that they will be called upon to run at substantially full capacity for several months to come, even though the market does not improve, and in many important lines there is assurance that they will have to run practically full until late in the year. Buyers as a class have undoubtedly turned very conservative in the past two or three weeks, and this reserve is attributed to the tariff talk. The mills are facing a serious labor shortage for this spring and summer, and judging by the activity of labor organizers at this time a few strikes in addition would not create surprise.

**Pig Iron.**—The market has continued lifeless, so far as concerns any general buying, and at some points the furnaces have weakened further. This week several valley furnaces have quoted standard No. 2 foundry iron at \$15.25, at furnace, or 25c. lower than last week's quotation. The Standard Sanitary Mfg. Company has just purchased 1000 tons of regular No. 2 foundry iron for early delivery to its Standard works, Pittsburgh, at \$16, delivered, equal to \$15.10, Valley, but the iron comes from a stack having a few cents lower freight rate than the valleys. Malleable iron can readily be had at \$15.50, Valley, and this price has been shaded in at least one instance. The pig-iron market has developed a test of strength between buyers and sellers, the whole attitude being a waiting one. Thus far the open developments have all been in buyers' favor, as prices have declined considerably, but this in its turn has strengthened the sellers' position, since prices are now near the cost of production, based on the ore advance for this season, which means \$1 added to the cost of making a ton of iron, and on the price of coke, apparently firm at \$2.25 to \$2.50. The most striking point in the local situation, however, is the fact that stocks of pig iron at merchant furnaces in western Pennsylvania and the valleys have been decreasing, and are now at the lowest point for a long time, being practically nil. Stocks in consumers' hands are without doubt very small. Production has not increased lately, while prospects are that consumption will continue undiminished for at least several months. We quote: Standard Bessemer, \$17; malleable, \$15.50; basic, \$15.75; No. 2 foundry, \$15.25; forge, \$14.75, all f.o.b. cars Valley furnace, with a freight rate of 90c. a ton for delivery in the Pittsburgh district.

**Billets and Sheet Bars.**—Deliveries of steel on contract have shown no improvement and it is feared the supply will be tighter than ever during the next couple of months. There are no market transactions to speak of. We quote: Bessemer billets, \$28.50 to \$29; Bessemer sheet bars, \$29 to \$29.50; open-hearth billets, \$29 to \$29.50; open-hearth sheet bars, \$29.50 to \$30, f.o.b. maker's mill, Pittsburgh or Youngstown. Forging billets, \$36 to \$37, and axle billets, \$34 to \$35, Pittsburgh.

**Ferroalloys.**—The market is extremely quiet on all the alloys, and prices are unchanged from last quotations. We quote English ferromanganese for prompt or forward delivery at \$61, Baltimore, the new freight

to Pittsburgh being \$2. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. at \$24; 11 per cent., \$25; 12 per cent., \$26, f.o.b. cars at furnace, Jackson, Ohio or Ashland, Ky. We quote ferrotitanium at 8c. per pound in carloads; 10c. in 2000-lb. lots and over; 12½c. in lots up to 2000 lb.

**Wire Rods.**—Consumers are taking full shipments and mills are very busy. There is practically no surplus offered in the market, while there is correspondingly little demand. We quote Bessemer, open-hearth and chain rods at \$30, Pittsburgh.

**Muck Bar.**—The market has shown some slight signs of softness, due to recent offerings of Eastern bar in this territory, but we continue to quote prime all pig muck bar at \$30, Pittsburgh.

**Skelp.**—The mills are taking their full quotas on skelp contracts, but are not in the market for any fresh tonnages and the market remains quiet but firm. We continue to quote: Grooved steel skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district. The advance of \$1 a ton in steel pipe a few days ago is not expected to have any appreciable effect on the skelp market.

**Steel Rails.**—Rail specifications continue very good and the mills have more than they can handle in open-hearth, particularly on account of the delay in completion of the open-hearth extension at the Edgar Thomson works, which will not be ready until July or August. We quite splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots f.o.b. Pittsburgh.

**Structural Material.**—There have been no important structural lettings in the past week, the market being rather quiet. A concern in the Wheeling district has closed for a pumping station at Buffalo, involving about 900 tons. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which would be second half of this year, while small lots from warehouse for prompt delivery are bringing from 1.60c. up to 2c., depending on the size of the order and the deliveries wanted.

**Iron and Steel Bars.**—There is now a heavy seasonal demand for concrete reinforcing bars, and early deliveries are hard to secure. A few of the producers are filled as far ahead as the end of October. Specifications for soft steel bars are about equal to current shipments. No fresh contracting is being done, and the implement makers seem to have lost interest in the bar market. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for shipment from warehouses 1.90c. to 2c. is quoted. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills charge \$1 extra per ton for twisting  $\frac{3}{4}$ -in. and larger steel bars and \$2 extra for  $\frac{1}{2}$  to  $\frac{3}{4}$  in.

**Sheets.**—Shading in galvanized sheets has reappeared since the temporary stiffening caused by the loss in production at the time of the floods, and several mills are quoting 3.40c. for early delivery. This has created no disturbance in the market, since the mills as a rule are still making deliveries on old contracts, taken before the regular advance to 3.50c. There is a heavy demand for automobile and other special sheets in the various black finishes, as well as for blue annealed. Specifications for black and galvanized sheets are running at about the same rate as shipments. This week the American Sheet & Tin Plate Company is operating about 75 per cent. of its sheet mills, this being as large a number as the supply of steel will cover. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.40c. to 3.50c. for No. 28 galvanized, and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

**Plates.**—The Grand Trunk has placed orders for 3000 box cars, the Pressed Steel Car Company getting 2000 and the Western Steel Car & Foundry Company 1000. Specifications for plates continue good and the mills can make only slightly better deliveries than 30 days ago. We quote  $\frac{1}{4}$ -in. and heavier tank plate at 1.45c., Pittsburgh, for forward delivery, fair-sized lots for delivery in three or four weeks at 1.60c. to 1.65c., and small lots for prompt delivery up to 2c., Pittsburgh.

**Tin Plate.**—The pressure for deliveries is heavy and the mills are experiencing difficulty in meeting consumers' requirements. Operations are at almost full rate, being limited only by the supply of steel. The

American Sheet & Tin Plate Company is this week running 88 per cent. of its tin mills, which means almost all its regularly operative mills, and the independents are doing almost as well, making a trifle over 300 tin plate mills in operation, producing about 400,000 boxes a week. Prices are firmly maintained. We quote 100-lb. cokes at \$3.60; 100-lb. terne at \$3.45, and No. 28 black plate at \$2.30, all f.o.b. Pittsburgh.

**Hoops and Bands.**—While specifications are heavy, shipments are being made at a satisfactory rate and there is little outside demand. The market is firm at 1.60c. for hoops, while bands are quotable at 1.40c. to 1.45c., extras on bands being according to the steel bar card. These prices are for delivery at mills' convenience, premiums being usually charged for prompt shipment.

**Bolts and Rivets.**—The market is quiet as to fresh buying, but specifications are fairly satisfactory against old contracts. We continue to quote regular prices at \$2.20 for button-head structural rivets and \$2.30 for cone-head boiler rivets. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Cochs and lag screws .....	80 and 10% off
Small carriage bolts, cut threads.....	.75 and 5% off
Small carriage bolts, rolled threads.....	.75 and 10% off
Large carriage bolts .....	.70% off
Small machine bolts, cut threads.....	.75 and 10% off
Small machine bolts, rolled threads.....	.75, 10 and 5% off
Large machine bolts .....	.70 and 7% off
Machine bolts with C.P.C. and T nuts, small.....	.75 and 5% off
Machine bolts with C.P.C. and T nuts, large.....	.70% off
Square hot pressed nuts, blanked and tapped.....	\$5.70 off list
Hexagon nuts .....	\$6.30 off list
C.P.C. and R. square nuts, tapped and blank.....	\$5.70 off list
Hexagon nuts, 5/8 and larger .....	\$6.60 off list
Hexagon nuts smaller than 5/8 .....	\$7.20 off list
C.P. plain square nuts .....	\$5.20 off list
C.P. plain hexagon nuts .....	\$5.50 off list
Semi-finished hexagon nuts 5/8 and larger .....	.85% off
Semi-finished hex. nuts smaller than 5/8 .....	.85 and 10% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	.75, 10 and 10% off
Rivets, metallic tinned, bulk.....	3 1/2c. per lb. net extra
Rivets, tin plated, bulk.....	1 1/2c. per lb. net extra
Rivets, metallic tinned, packages.....	.70, 10 and 10% off

**Wire Products.**—Specifications for wire products against contracts are fairly good, and better than they have been for several weeks. Practically no new business is being booked by mills. We quote makers' prices to jobbers as follows: Wire nails, \$1.80 base, per keg; cut nails, \$1.70 to \$1.75; galvanized barb wire, \$2.20 per 100 lb.; painted, \$1.80; annealed fence wire, \$1.60, and galvanized fence wire, \$2, f.o.b. Pittsburgh, usual terms, freight added to point of delivery. Jobbers charge the usual advances over these prices for small lots from store.

**Railroad Spikes.**—Specifications against contracts for railroad spikes are heavy and fully up to the expectation of producers. Little new business is being placed. We quote railroad spikes in base sizes, 5 1/2 x 9-16 in., on large contracts with the railroads, at \$1.80, while for carload lots \$1.00 is charged; small railroad and boat spikes, \$1.00 to \$2 per 100 lb., f.o.b. Pittsburgh, for forward delivery.

**Shafting.**—The demand is moderately active, but there is little new buying, as consumers are well covered by old contracts. We quote cold-rolled shafting at 58 per cent. off in carload lots, and 53 per cent. in small lots delivered in base territory, the usual slight differential over these discounts being allowed to the very largest consumers.

**Merchant Steel.**—Mills are having a fair run of specifications on contracts, while there is little new buying. Prices are firm and we quote: Iron finished tire, 1 1/2 x 1/2 in. and larger, 1.40c. to 1.55c., base; under 1 1/2 x 1/2 in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, 3/4 to 5/8 and 1 in., 1.90c. to 2c.; 1 1/8 in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

**Iron and Steel Scrap.**—Consumers continue to buy scrap rather sparingly, although there is a moderate turnover. We note a sale of 2000 tons of heavy melting steel at \$14.50, delivered, but few consumers are bidding even \$14.25, which price would not bring out any considerable tonnage from dealers. Dealers are able to pick up considerably more material than formerly, paying \$14.25 for off lots, though for a carload or two they do not bid over \$14. The only real change

in the situation in the past week is that somewhat more material is coming from the country dealers, which may be due to the opening up of better weather. The market has heard practically nothing from scrap expected to be developed by the floods in Ohio, and is not looking for any great amount from that quarter. Rolling mills are buying No. 1 wrought fairly well, and are paying slightly better prices, as we note a sale of 500 tons to a mill in this district at \$16, delivered. The foundries are buying only in small lots, but are paying as good prices as at any time recently. Machine shop turnings continue in poor demand, and we reduce quotations 25c. from last week, making turnings \$2 a ton below cast borings, whereas until the slump in turnings last January the spread was about \$1 a ton the other way. Quotations are revised slightly this week, and stand as follows per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery .....	\$14.00 to \$14.50
No. 1 foundry cast .....	14.50 to 14.75
No. 2 foundry cast .....	13.50 to 13.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district .....	10.25 to 10.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. ....	16.00 to 16.50
No. 1 railroad malleable stock .....	13.50 to 13.75
Grate bars .....	10.25 to 10.50
Low phosphorus melting stock .....	16.50 to 16.75
Iron car axles .....	26.50 to 27.00
Steel car axles .....	18.00 to 18.25
Locomotive axles, steel .....	23.50 to 24.00
Locomotive axles, iron .....	27.00 to 27.25
No. 1 busheling scrap .....	13.25 to 13.50
No. 2 busheling scrap .....	9.50 to 9.75
Old carwheels .....	15.00 to 15.50
*Machine shop turnings .....	8.25 to 8.50
*Cast-iron borings .....	10.25 to 10.50
*Sheet bar crop ends .....	16.00 to 16.25
Old iron rails .....	16.25 to 16.50
No. 1 railroad wrought scrap .....	15.50 to 16.00
Heavy steel axle turnings .....	11.50 to 11.75
Stove plate .....	10.50 to 11.00

\*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

**Merchant Pipe.**—Specifications against steel pipe contracts have shown further improvement, and most of the mills have a large volume of specifications on books. The recent advance of a half point has been well taken, all producers adhering rigidly to the new price, so that the market is steadier than it was before the advance. Mills are running at capacity, except where shortage of steel prevents, and the outlook is for full production through the summer, the volume of line pipe on books being very large. The iron pipe market shows no change.

**Boiler Tubes.**—The market continues strong, with mills producing at full capacity and well sold up. Discounts are reported as being firmly held.

**Coke.**—There are occasional quiet sales of prompt furnace coke at less than \$2.25, but as a rule operators do not shade this figure. The furnaces are now taking practically normal shipments, the effects of the flood having worn off. There is no interest in contract coke, consumers being covered on contracts to July 1 and in many cases through the year, but operators insist that they would not accept less than \$2.50 per net ton at oven for second half. Foundry coke is in moderate demand, and while prices are somewhat easier than 30 days ago standard brands of 72-hour foundry coke cannot be had at less than \$3 per net ton at oven, some sellers quoting up to \$3.50, these prices referring to both prompt and contract. The Connellsville Courier gives the total output of the Upper and Lower Connellsville regions last week as 370,676 net tons, a decrease of 298 tons from the preceding week.

## Chicago

CHICAGO, ILL., April 23, 1913.—(By Telegraph.)

To those disposed to view the market so as to find in the immediate happenings a forecast of untoward events to come, the past week offers more excuse than has appeared in many months. For the lack of new business in finished steel products, the optimist still sees a logical explanation and temporary duration. Such strength as the market presents it derives from orders previously accumulated. These orders will be filled and the material used, but new projects calling for additional material are not pressing forward. There are those who see in the tightness of money and in the more conservative attitude of purchasing departments a growing feeling of uncertainty and caution. This feeling could not be more pronounced than it is with respect to pig iron. Yet a heavy contracting for last-half pig iron

seems inevitable, to be accompanied probably by a sharp reaction from the now declining market. New steel tonnage, the booking of which is already assured, may in like manner bring about a renewal of impetus in the general steel situation.

**Pig Iron.**—Except for the closing of a comparatively few, scattering lots of Northern iron in quantities up to 1500 tons, pig iron is gradually enmeshing itself in the web of delay that has been steadily woven about by the melter, but it has not yet weakened sufficiently to entice the cautious buyer from his vantage point where, hovering on the edge of the market, he waits the favorable hour for gathering in the reward for his patient waiting. The key to the local situation lies with the Southern furnaces. The price has now been allowed to drop to \$12, Birmingham, with no result other than an emphasizing of the market weakness. The corresponding price of \$16.35 at Chicago, or \$16.75 at Milwaukee, is not an unattractive basis for the more desirable Northern high phosphorus iron, but even this has not seemed a sufficient inducement as yet. Standard Lake iron would be available without question at a satisfactory price if definite offers of contract tonnage were forthcoming, but the market will follow the course of Southern iron and buyers are not yet assured that the bottom has been reached. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4.....	\$18.00 to \$18.75
Northern coke foundry, No. 1.....	17.25 to 17.75
Northern coke foundry, No. 2.....	16.75 to 17.25
Northern coke foundry, No. 3.....	16.25 to 16.75
Southern coke, No. 1 foundry and No. 1 soft.....	16.85 to 17.35
Southern coke, No. 2 foundry and No. 2 soft.....	16.35 to 16.85
Southern coke, No. 3.....	15.85 to 16.35
Southern coke, No. 4.....	15.85 to 16.35
Southern gray forge.....	15.85 to 16.35
Southern mottled.....	15.85
Malleable Bessemer.....	16.75 to 17.25
Standard Bessemer.....	19.40 to 19.90
Basic.....	16.75 to 17.25
Jackson Co. and Kentucky silvery, 6 per cent.....	20.40
Jackson Co. and Kentucky silvery, 8 per cent.....	21.40
Jackson Co. and Kentucky silvery, 10 per cent.....	22.40

#### (By Mail)

**Rails and Track Supplies.**—It is understood that the Colorado mill shared largely in the rail tonnages of the Missouri Pacific and the Denver & Rio Grande railroads, the former road having been in the market for 25,000 tons and the latter 10,000 tons. A lot of 4500 tons was placed with the local mills. Track work is being pushed by all the railroads as rapidly as possible in order to anticipate the expected shortage of labor. The mills are being crowded accordingly for the earliest deliveries. Outside of requirements already provided for, further railroad projects appear to be generally held in abeyance. We quote standard railroad spikes at 1.90c. to 2c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, \$33 to \$35 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—Contracts for fabricated steel totaling approximately 5400 tons, of which the American Bridge Company will furnish about 3000, were closed the past week. The orders secured by that company include 1275 tons for the San Francisco warehouse of the United States Steel Products Company, 156 tons for the Santa Fé Railway's Panama-Pacific Exposition building, 796 tons for the Chicago, Milwaukee & St. Paul and 844 tons for the Chicago & Northwestern shops at Clinton, Ia. The Chicago Steel Products Company will fabricate 900 tons for the Washington Securities Building at Seattle; the South Halsted Street Iron Works 700 tons for a factory building for Joseph E. Tilt at Chicago; the Wisconsin Bridge Company, 343 tons for the Chicago & Alton; the Bellefontaine Bridge Company, 130 tons for four spans at Roseburg, Ore., and the Northwest Steel Company, 248 tons for a Willamette River bridge at Newberg, Ore. There is less of new mill business in structural shapes, fabricators in this territory being well supplied with stock tonnage. New car tonnage of importance is limited to the Grand Trunk order previously announced. Prices are unchanged and we quote for Chicago delivery, mill shipment, 1.63c. to 1.68c.

From warehouse stocks the shipment of structural shapes is holding up both in number of orders and aggregate tonnage to a volume which shows comparatively greater activity in store demand than mill. We quote from jobbers' stocks on base sizes 2.05c.

**Plates.**—Plate users generally are finding their contract shipments ample to meet their current needs and

there is little new business offering for mill delivery. We quote for mill shipment, Chicago delivery, 1.63c. to 1.68c.

From store the demand for plates is less prominent than in similar lines. Prices are without change and we quote for local delivery 2.05c.

**Sheets.**—While prices are nominally quoted on the basis of 3.50c., Pittsburgh, for galvanized, concessions of \$2 a ton are increasingly common. This weakness is attributable with regard to galvanized sheets to the decline in the price of spelter, but for the shading of black-sheet prices equally current, though limited in most instances to \$1 a ton, the situation of a comparatively few mills is held responsible. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.93c.

Among the warehouse products, sheets are perhaps less in demand than most of the other lines. Prices are unchanged. Out of store prices continue without change as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

**Bars.**—Mill orders for steel bars continue to materialize in good volume. A number of implement manufacturers are contracting, but the greater portion of this business is as yet unplaced and in many cases current needs are being met by straight orders pending the placing of contracts. Such contracts as are being placed are for the six months from July 1 to January 1, almost without exception. Thus far buyers are apparently indifferent in their insistence upon the customary yearly contracts, an attitude easily explained by the fact that prices are now as high as they are likely to be, but it is not yet assured that the larger contracts still to be closed will be on the same basis. Enough bar-iron business develops from day to day to hold the mill situation on a steady basis. We quote for mill shipment as follows: Bar iron, 1.57½c. to 1.62½c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

The bar business out of warehouse maintains its exceptional gait, particularly in the smaller sizes and in hoops and bands. For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes  $\frac{3}{4}$  in. and over, and  $7\frac{1}{2}$ c. extra for smaller sizes; shafting 51 per cent. off.

**Wire Products.**—These are reported as moving actively from the jobber to the retail trade, in contrast to the falling off in mill shipments which may be traced to the previously well supplied stocks in warehouses and jobbers' hands. We quote as follows to jobbers: Plain wire, No. 9 and coarser, base, \$1.78; wire nails, \$1.98; painted barb wire, \$1.98; galvanized, \$2.38; polished staples, \$1.98; galvanized, \$2.33, all Chicago.

**Rivets and Bolts.**—It is not entirely surprising that in the quiet period now prevailing some weakness in bolt and nut prices should appear. It is also to be remembered that the season of implement contracting is also close at hand. Rivet sales are desultory, with no improvement in the shading of the nominal mill prices. We quote from mill as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to  $\frac{3}{8}$  x 4 in., rolled thread, 70-10-5; cut thread, 75-10; large size, 70-7½; coach screws, 80-10 hot pressed nuts, square head, \$5.70 off per cwt.; hexagon, \$6.30 off per cwt. Structural rivets,  $\frac{3}{4}$  to  $1\frac{1}{4}$  in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to  $\frac{3}{4}$  x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to  $\frac{3}{4}$  x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

**Cast-Iron Pipe.**—In the absence of any municipal lettings of important tonnage, the bookings of last week were limited to an aggregate of small lots. The lack of business in the larger sizes of pipe and the general weakness of the pig iron market have brought about a further reduction in pipe prices of \$1 a ton. We have revised our quotations and quote as follows per net ton, Chicago: Water pipe, 4 in., \$29.50; 6 to 12 in., \$27.50; 16 in. and up, \$26.50, with \$1 extra for gas pipe.

**Old Material.**—Further declines in the quoted prices of all grades of scrap emphasize the general weakness of the market. Old material in overabundance was offered on every hand the past week, and the apparently unlimited supply available offers slight prospect of a better balance between supply and demand in the near future. Additional railroad offerings include 1050 tons by the Chicago, Milwaukee & St. Paul; 800 tons by the Nickel Plate, and 3200 tons by the Chicago, Burlington

& Quincy. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

*Per Gross Ton.*

Old iron rails	\$16.00 to \$16.50
Old steel rails, rerolling	14.50 to 15.00
Old steel rails, less than 3 ft.	13.50 to 14.00
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	16.75 to 17.25
Heavy melting steel scrap	12.50 to 13.00
Fangs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	12.25 to 12.75
Steel axle turnings	10.50 to 11.00

*Per Net Ton.*

Iron angles and splice bars	\$15.75 to \$16.25
Iron arch bars and transoms	16.00 to 16.50
Steel angle bars	11.50 to 12.00
Iron car axles	21.00 to 21.50
Steel car axles	18.75 to 19.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.25 to 11.75
Cut forge	11.25 to 11.75
Steel knuckles and couplers	11.75 to 12.25
Steel springs	12.25 to 12.75
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	7.25 to 7.75
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.75 to 8.25
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
Boiler punchings	12.25 to 12.75
No. 1 cast scrap	12.25 to 12.75
Stove plate and light cast scrap	10.25 to 10.75
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.25 to 11.75
Pipes and flues	9.00 to 9.50

## Philadelphia

PHILADELPHIA, PA., April 22, 1913.

The iron market continues weak. Buyers are holding off, awaiting developments, but sellers are less inclined to make further concessions. A fair volume of business is moving in finished materials, Eastern plate mills receiving orders in excess of shipments. Open-hearth rolling billets are active, the largest transaction being a sale of 15,000 tons for third quarter shipment, to go West. Sheets are active. Iron bars have been in lighter demand and prices are weak. There has been little movement in coke. The old material market is irregular, with declines in nearly all grades.

**Iron Ore.**—Consumers show less interest in the market. New business in either foreign or domestic ore is very light. Negotiations for a block of 10,000 to 15,000 tons of Canadian ore have been suspended. Importations during the week include 6556 tons of Swedish and 14,800 tons of Cuban ore. The importation of a sample lot of 113 tons of German bog iron ore is also noted.

**Pig Iron.**—Buying has been comparatively light. The recent concessions in prices have had the effect of making buyers even more conservative. While it seemed likely a few weeks ago that heavy buying was in sight, consumers are showing more hesitancy in placing orders until they feel sure that the bottom has been reached. Several producers have recently made very low prices and in other instances quiet concessions have been made to regular customers. For current small lot orders, which make up the bulk of the business moving in this district, standard brands of eastern Pennsylvania No. 2X foundry are nominally quoted at \$17.25 to \$17.50, but there is little doubt that, if a round lot of iron was involved, those figures could be shaded. Some recent low sellers have taken all the business wanted at concessions and are now quoting \$17.25 delivered, as the cost of production, with high ore, labor and fuel, has been closely approximated at the prices at which business was taken. There has been little movement in low grade iron in this district. One cast-iron pipe maker has been negotiating for several thousand tons of Southern low grade, but the business has not been closed. Moderate sales of Pennsylvania forge iron have been made to rolling mills. Seldom has more than a few hundred tons been involved, at prices ranging from \$16.25 to \$16.50 delivered. One sale of 1000 tons of Southern mottled was made to a Schuylkill Valley mill at \$10.50, Birmingham, Virginia foundry has been quiet; small lots are selling at \$15 at furnace for No. 2X, but this price could be shaded for a round lot. Resale Virginia iron at price concessions is still in evidence. A Virginia cast-iron pipe maker has purchased 2000 tons of low grade Virginia iron for one and 1200 tons for another one of its plants. A sale of 500 tons of coke malleable has been made to a consumer in this vicinity. Following the recent heavy purchase of basic iron by the principal buyer in the East, by which 40,000 tons was taken at \$16.50 delivered, the demand has been quiet, although one small buyer is

feeling around and another is expected in the market in the near future. Little business has developed in standard brands of low phosphorus iron. Producers of this grade are well sold up and prices are firm at \$23.50 delivered here. Further sales aggregating 1500 tons of Lebanon low phosphorus have been made at \$20 at furnace. The general range of pig-iron prices, for delivery in buyer's yards in this district, shows little change, but weakness is still in evidence in foundry grades, for which prices quoted may be considered nominal:

Eastern Pennsylvania No. 2 X foundry	\$17.25 to \$17.50
Eastern Pennsylvania No. 2 plain	17.00 to 17.25
Virginia, No. 2 X foundry	17.80 to 18.00
Virginia, No. 2 plain	17.55 to 17.75
Gray forge	16.25 to 16.50
Basic	16.50
Standard low phosphorus	23.50

**Ferroalloys.**—There has been practically no inquiry for forward 80 per cent. ferromanganese, quotations for which are nominally \$61, seaboard. Several carload sales for early delivery have been made on the same basis. Importations of ferromanganese at this port last week aggregated 1781 tons. Furnace ferrosilicon, which is scarce for early shipment, has been sold at \$29.30, delivered, representing an advance of \$1 a ton.

**Billets.**—The leading producer in the East has made a sale of rolling billets to the United States Steel Corporation involving 15,000 tons for third quarter, for Western shipment, at a lower basis than \$30, delivered here. Moderate sales for delivery in this district have been made at \$30, delivered, but for forward shipment this price can be shaded, probably \$1 a ton. Forging billets continue firm at \$36, minimum, Eastern mill, for ordinary analysis specifications. Mills in the East are comparatively well fixed with orders for delivery over the remainder of the first half of the year.

**Plates.**—The volume of business coming to Eastern mills continues in excess of shipments, and a leading mill has again advanced delivery dates, five to six weeks now being the best that can be done. Several good-sized inquiries for boat material are before the trade. Eastern mills are maintaining 1.75c., delivered here, for sheared plates, but the \$1 differential for universal plates is not being strictly adhered to. Western plates continue available for extended delivery at 1.60c. to 1.65c. here.

**Structural Material.**—New business in fabricated structural work has been rather light, but plans are out for a new building which it is proposed to erect on the site of the Haseltine Building, expected to require several thousand tons of steel. Bids have gone in for 1000 tons for the St. Clair shops for the Philadelphia & Reading Railway. Little new bridge work has come out. A satisfactory volume of business in miscellaneous plain shapes is coming to Eastern mills, although heavy shapes have been less active. Mills not able to do better than 8 to 10 weeks' delivery on light shapes can supply heavy shapes in 3 to 4 weeks. Prices continue irregular, ranging from 1.65c., delivered here, for heavy to 1.75c., Eastern mill, for light shapes. Eastern makers quote 1.60c., delivered here, for plain shapes, but have difficulty in making satisfactory delivery.

**Sheets.**—An active demand for both prompt and forward delivery continues. Eastern mills are booking satisfactory orders, but are not obtaining large premiums for early shipment. Western No. 10 blue annealed sheets are quoted at 1.90c. here, while Eastern mills making smooth, loose-rolled sheets now quote 1.90c. to 1.95c. for reasonably early deliveries. Mill capacities in the East are now fairly well taken for near future shipment.

**Bars.**—The demand continues light. Makers of ordinary iron bars show more anxiety for business. With sharper competition prices have become easier and 1.50c. to 1.55c. mill, equal to 1.57½c. to 1.62½c. delivered here, can be done, although on some grades of bars 1.70c. to 1.75c. delivered, continues to be named. Steel bars are active and for early delivery are scarce. Prices are firm at 1.55c. to 1.60c. for contract steel bars.

**Coke.**—The market continues unsettled. Buying in both foundry and furnace grades has been light. Little contract coke has been offered. Furnace coke is quoted at \$2 to \$2.25, at oven, for early shipment. Foundry coke in moderate lots is selling at \$2.75 to \$3.40 at oven, according to grade. The following range of quotations is named, per net ton, for delivery in buyers' yards in this vicinity:

Connellsburg furnace coke	\$4.25 to \$4.75
Connellsburg foundry coke	4.90 to 5.50
Mountaineer furnace coke	4.15 to 4.65
Mountaineer foundry coke	4.60 to 5.25

**Old Material.**—Lower prices have developed in nearly all grades. Consumers being well supplied, they have either withdrawn from the market or are offering mate-

rially lower prices. Small sales of No. 1 heavy melting steel have been made at \$13, delivered. Rolling mill grades are in easier demand. Old carwheels are quiet at lower prices. Very little business has been done in any grade. Quotations, while to a large extent nominal, range about as follows for delivery in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$13.00 to \$13.50
Old steel rails, rerolling (nominal)	15.50 to 16.00
Low phosphorus heavy melting steel scrap	17.25 to 17.50
Old steel axles (nominal)	19.00 to 20.00
Old iron axles (nominal)	26.00 to 27.00
Old iron rails	18.00 to 18.50
Old carwheels	14.50 to 15.00
No. 1 railroad wrought	15.00 to 15.50
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 cut busheling	9.50 to 10.00
Wrought turnings	10.00 to 10.50
Cast borings	10.00 to 10.50
Machinery cast	13.75 to 14.25
Grate bars, railroad	10.25 to 10.75
Stove plate	10.25 to 10.75
Railroad malleable (nominal)	13.00 to 13.50

## Birmingham

BIRMINGHAM, ALA., April 21, 1913.

**Pig Iron.**—Asked what is the matter with the Southern iron market a prominent operator said, "The politicians." Several producers are inclined to believe that the market will not recover until the tariff discussion is over with. There is confirmation of liberal offerings of \$12.50 iron by furnaces and it is asserted in Birmingham that \$12.50 is the prevailing quotation for second quarter and second half as well. It is believed that Tennessee furnaces will shade that price by giving away some of the differential in freight rates, and that resale iron as well as some furnace iron might also be had in Alabama under \$12.50, although no open offerings at that figure are made. The further concessions are not believed to have produced any great business. As an example, it is reported that a Tennessee furnace which has a small output and did not enter the field until the early portion of this year, had until very recently sold only a few hundred tons out of a production of 5000 to 7000 tons, in spite of keeping in line with the concessions. On the other hand, a large Birmingham district company sold 5000 tons in the early part of the month around \$13 and the reported sale about the same time of 1000 tons of lower grade irons on a \$13.25 basis for No. 2 by another Alabama interest is also confirmed. Accumulations on yards had increased by April 1 to 125,000 tons as against a minimum of 75,000 last December. That is not considered an excessive amount. Further accessions to stocks are believed to have occurred this month. Production is at a maximum and there is no indication of curtailing it. The Woodward Iron Company's new furnace will be ready for the torch in about 30 days. This company has completed and is now filling an 11,000,000-gal. reservoir and is using a recently completed \$200,000 electric plant. It is understood that appropriations for 1912-13 expenditures, including the 80 Koppers ovens, amounted to something like \$2,000,000. Quotations per gross ton, f.o.b. furnaces, for second quarter and second half, the general basis being found in the first column, are as follows:

No. 1 foundry and soft	\$13.00 to \$13.50
No. 2 foundry and soft	12.50 to 13.00
No. 3 foundry	12.25 to 12.75
No. 4 foundry	12.00 to 12.50
Gray forge	11.75 to 12.25
Basic	13.00 to 13.50
Charcoal	25.00 to 25.50

**Cast-Iron Pipe.**—The water-pipe manufacturers still report a dearth of orders for large consignments as well as a lull even in inquiries, while the small business is about the same. Concessions of \$1 a ton for small sizes are reported. Shops are operating on comparatively full time, with stocks accumulating. Quotations remain at \$23.50 per net ton for 4 in. and \$21.50 for 6 in. and upward, with \$1 added for gas pipe. The pig iron market is closely scrutinized.

**Coal and Coke.**—Alabama coal mines are operating on full time, and while the domestic demand is off, owing to the season, steam coal is active, with prices strong and satisfactory. There is no change in the coke situation. The plants are busy and the demand exceeds the output. Prices per net ton f.o.b. ovens are as follows: Furnace coke, \$3 to \$3.50; foundry coke, \$3.50 to \$4.

**Old Material.**—Old material is moving very slowly. The local demand is small and shipments north are not large in the aggregate. Relying rails have been in good demand right along and steel reflects the same condition. Prices vary with individual transactions. Quotations are as follows per gross ton f.o.b. dealers' yards:

Old iron axles	\$15.00 to \$15.50
Old steel axles	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	10.50 to 11.50
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	11.00 to 11.50
Standard carwheels	12.50 to 13.00
Light cast and stove plates	8.50 to 9.00

## Cincinnati

CINCINNATI, OHIO, April 23, 1913.—(By Telegraph.)

**Pig Iron.**—It is generally known that buyers in this territory are in a receptive mood, but they are not taking hold as fast as was expected. The softening in prices, especially in the South, is said to be one cause of this hesitancy. As soon as melters are convinced that the bottom has been reached it is predicted that a large buying movement will commence. Many are compelled to purchase small lots to tide them over the remainder of the first half of the year, and a large percentage will be compelled soon to come into the market for last-half requirements. The resumption of foundry activities after the recent floods has already materially increased the melt and shipments on old contracts are now going forward at a satisfactory rate. Southern prices have slumped again and No. 2 foundry is now obtainable from several interests at \$12, Birmingham basis, for third quarter shipment and in spite of the fact that a few furnaces are holding out firmly for \$13 for last half movement. Others are openly offering to take on last half orders at \$12.50. While there are rumors that the last-named figure can be shaded, these emanate from buyers' sources and cannot be substantiated. As far as known, \$15.50, Ironton, is the best that can be done on Northern No. 2 foundry, although this same price is being named for shipment through the year. A central Indiana firm has contracted for 1500 tons of Southern foundry iron for last-half shipment, and it is rumored that a manufacturer with several large plants in the Central-West also booked a sufficient quantity for this year's requirements. Several sales in St. Louis territory are reported, including 1000 tons of Southern low phosphorus iron and a smaller tonnage of Northern malleable. No definite inquiries have yet come out for basic. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	\$15.75 to \$16.25
Southern coke, No. 2 foundry and 2 soft	15.25 to 15.75
Southern coke, No. 3 foundry	15.05 to 15.55
Southern, No. 4 foundry	14.85 to 15.35
Southern gray forge	14.65 to 15.15
Ohio silvery, 8 per cent. silicon	20.20 to 20.70
Southern Ohio coke, No. 1	17.20 to 17.70
Southern Ohio coke, No. 2	16.70 to 17.20
Southern Ohio coke, No. 3	16.45 to 16.95
Southern Ohio malleable Bessemer	17.20
Basic, Northern	16.70 to 17.20
Lake Superior charcoal	18.75 to 19.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

**Coke.**—To a small extent the transportation situation has been relieved, and furnace operators are able to obtain a sufficient supply of coke for immediate needs. The railroads were prompt in getting their lines into shape, considering the great damage done by the recent floods, but there are a large number of cars that were lost en route, and are only turning up now. The demand for foundry coke is improving, and before the close of the month practically all foundries in this section will be operating to capacity. The quick work in getting their plants in shape accounts for the urgent orders for small lots from foundries. Previous quotations of \$2.25 to \$2.50 per net ton at oven on 48-hr. brands, and from \$3 to \$3.50 on 72-hr. coke, prevail in all three producing districts. It is stated, however, that prompt shipment foundry coke can be obtained around \$2.75, in some cases.

**Finished Material.**—The local warehouses are getting all the business they can handle, most of which comes in the shape of small orders. They are somewhat handicapped by the slowness of the railroads in delivering cars that have been en route from the mills for nearly a month. Some of these cars were switched to safe points above the flood line, and through a con-

fusion of records have been temporarily lost. This condition will doubtless be straightened out in the next few days. Local warehouse prices on steel bars remain around 2.10c. to 2.15c., and on structural material from 2.10c. to 2.25c. The expected large demand for structural material has not yet developed, although a number of rush orders were placed for bridge material.

**Old Material.**—None of the local or nearby foundries is purchasing at present. The rolling mills are also not buying, and hence little actual business is being transacted, though the outlook is brighter. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

*Per Gross Ton.*

Bundled sheet scrap .....	\$10.00 to \$10.50
Old iron rails .....	13.50 to 14.00
Relaying rails, 50 lb. and up.....	20.50 to 21.00
Reshaping steel rails .....	12.50 to 13.00
Melting steel rails .....	10.50 to 11.00
Old carwheels .....	12.25 to 12.75

*Per Net Ton.*

No. 1 railroad wrought .....	\$10.50 to \$11.00
Cast borings .....	6.25 to 6.75
Steel turnings .....	6.25 to 6.75
No. 1 cast scrap .....	10.25 to 10.75
Burnt scrap .....	7.50 to 8.00
Old iron axles .....	17.75 to 18.25
Locomotive tires (smooth inside) .....	11.50 to 12.00
Pipes and flues .....	7.00 to 7.50
Malleable and steel scrap .....	8.75 to 9.25
Railroad tank and sheet scrap .....	5.75 to 6.25

**Cleveland**

CLEVELAND, OHIO, April 22, 1913.

**Iron Ore.**—Ore shipments have been started from the upper Lake ports, opening what is expected will be the busiest season ever known. Heavy ore sales, the tying up of the bulk of the vessel tonnage, and the continued heavy consumption unite in confirming the belief that has been expressed from time to time that a new record in the movement of ore will be established in 1913. The first ore cargo left Duluth April 20. On Monday and Tuesday several cargoes got away from Escanaba, and as these will not be interfered with by ice they will reach lower Lake ports the later part of the week. No boats can get through from Lake Superior yet, as the ice is solid at Whitefish Point. Ore cargoes are being loaded at all of the upper Lake ports and the movement is expected to be heavier the first few weeks of the season than for several years. No new sales are reported. We quote prices as follows: Old Range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old Range non-Bessemer, \$3.60; Mesaba non-Bessemer, \$3.40.

**Pig Iron.**—Competition for last-half business has resulted in a further weakening of the market on foundry grades and several sales were made during the week at \$15. Valley furnace, for No. 2, a decline of 50c. as compared with the price that prevailed a week ago. This price appears to represent the bottom of the market at present and some sellers report making sales as high as \$15.50. However, the quotation of \$15.25 has been quite generally made on small inquiries and it is probable that most sellers would name the \$15 price on a round lot inquiry. Price concessions have not as yet stirred up much activity. Consumers are apparently watching the situation more closely than for some time but most of them are waiting for the bottom to be reached before placing contracts. Producers claim that \$15 now represents about the cost of making foundry iron, and that the present cost is about \$2 higher than a year ago when foundry grades were selling at \$13, the increased cost being due to higher priced ore and coke and higher wages for labor. The scarcity of iron for delivery on contracts caused by the banking and blowing out of furnaces because of the recent floods continued during the week. Foundries have been clamoring for their iron, and two or three in this territory were forced to suspend operations for a few days because they were unable to secure shipments. This situation, however, is expected to be relieved considerably before the week is over as furnaces are now getting back to their normal production of good iron. Corrigan, McKinney & Co. blew in their second Cleveland stack April 17. It was blown out after the floods. McKeefrey & Co. expect to blow in their stack at Leetonia, Ohio, on malleable iron next month. This furnace has been idle about two years. The largest inquiry pending in this territory is from a manufacturer with plants in Willoughby and Bucyrus, Ohio, for 1300 tons of foundry iron for the last half. The Southern situation is weak. While No. 2

Southern is quoted at \$12.25 to \$12.50, Birmingham, for delivery through the remainder of the year salesmen are asking for \$12 offers. For shipment the remainder of the year we quote, delivered Cleveland, as follows:

Bessemer .....	\$17.90
Basic .....	\$16.40 to 16.65
Northern No. 2 foundry .....	15.90 to 16.25
Southern No. 2 foundry .....	16.60 to 16.85
Gray forge .....	15.50 to 15.75
Jackson County silvery, 8 per cent. silicon..	20.55 to 21.05

**Coke.**—There is practically no demand for either grade. Prices show no change. Connellsville furnace coke is quoted at \$2.25, per net ton at oven, for spot shipment and \$2.25 to \$2.50 for contract. Standard 72-hr. Connellsville foundry coke is held at \$3 to \$3.25 for prompt shipment and contract.

**Finished Iron and Steel.**—Mills are getting a moderate volume of specifications but new business is light. The easing up in the demand is having some effect in making mill deliveries better. Manufacturers are showing less eagerness in placing future orders because of fear of the effects that tariff revision will have on business. However, manufacturing plants are at present crowded with work and there are only few reports of falling off of orders on their books. The consumption of steel appears to be as heavy as ever and mills are getting no cancellations from their customers. Warehouse business continues heavy. Engineers are working on plans for a large amount of bridge work for replacements made necessary by the recent Ohio floods and it is expected that orders for steel for this work will begin to come out in the next week or two. Local fabricating shops are well filled with work, having more on their books than a month ago. This is mostly for small buildings, for which steel can be secured out of fabricators' stocks. Some large building work is being deferred because of the difficulty in securing steel for early delivery. Jobbers are in the market for merchant steel contracts for the last half. Eastern mills continue to get a fair volume of orders in this market for plates and structural material for early delivery at 1.60c. at mill for the former and 1.65c. for the latter. Reinforcing bars are in good demand. Sheet deliveries have eased up somewhat now that the mills have recovered from flood conditions. The demand for sheets is fair. The Toledo Railways & Light Company is in the market for 600 tons of rails, in addition to those recently purchased. The demand for iron bars is not active but local prices are firm at 1.60c. to 1.65c. Cleveland. Warehouse prices are unchanged at 2.10c. for steel bars and 2.25c. for plates and structural material.

**Old Material.**—Dealers are busy making shipments on contract but there is little new demand. Mills are taking some small lots of material that are offered them at price concessions but are not making purchases for future delivery. As some existing contracts are nearly cleaned up, dealers are looking for a better demand in the near future. Prices are not firm but quotations are unchanged. We quote f.o.b. Cleveland as follows:

*Per Gross Ton.*

Old steel rails, reshaping .....	\$14.50 to \$15.00
Old iron rails .....	16.00 to 16.50
Steel car axles .....	18.75 to 19.25
Heavy melting steel .....	12.75 to 13.00
Old carwheels .....	15.00 to 15.50
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable .....	11.75 to 12.00
Railroad malleable .....	13.50 to 14.00
Light bundled sheet scrap .....	10.00 to 10.50

*Per Net Ton.*

Iron car axles .....	\$21.00 to \$21.50
Cast borings .....	7.50 to 8.00
Iron and steel turnings and drillings.....	6.00 to 6.25
Steel axle turnings .....	9.00 to 9.25
No. 1 busheling .....	11.50 to 12.00
No. 1 railroad wrought .....	13.25 to 13.50
No. 1 cast .....	12.25 to 12.50
Stove plate .....	9.00 to 9.50
Bundled tin scrap .....	11.00 to 11.50

**Boston**

BOSTON, MASS., April 22, 1913.

**Old Material.**—The scrap market does not improve, and the price of steel has been reduced 50c. The dealers are doing some business, more than a year ago. But buying is from hand to mouth. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is in-

cluded. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$11.00 to \$11.25
Low phosphorus steel	13.50 to 14.50
Old steel axles	14.50 to 15.00
Old iron axles	22.50 to 23.00
Mixed shafting	13.50 to 13.75
No. 1 wrought and soft steel	10.75 to 11.00
Skeleton (bundled)	9.00 to 9.50
Wrought-iron pipe	10.00 to 10.25
Cotton ties (bundled)	9.50 to 9.75
No. 2 light	4.00 to 4.50
Wrought turnings	7.50 to 7.75
Cast borings	7.50 to 7.75
Machinery, cast	13.50 to 14.00
Malleable	10.50 to 11.00
Stove plate	8.50 to 9.00
Grate bars	7.50 to 7.75
Cast-iron carwheels	15.00 to 15.50

## German Weakness More Pronounced

Decline in Bars and Plates but Pig Iron and Crude Steel Are Firm

BERLIN, April 10, 1913.

The position of the iron trade has deteriorated within a week in a more pronounced form than hitherto. On the Düsseldorf Exchange on Friday steel bars were quoted at 118 to 121 marks against a previous quotation of 121 to 124 marks; heavy tank plates, 130 to 135 marks against 132 to 135; boiler plates, 140 to 145 marks against 142 to 145, and thin plates at 140 to 145 marks against 145 to 147.50. A private dispatch of the same date says that bars are sold 1 to 2 marks below the officially quoted prices, as the mills are exerting themselves to get new orders, notwithstanding the fact that calls for delivery on old contracts are coming in briskly. Siegen advices state that a sharp drop in thin plates has occurred owing to the lack of new orders; offers are made by manufacturers as low as 137.50 marks. It is added that heavy plates, with the exception of ship plates, have fallen 5 marks.

The weakness of prices has not yet affected pig iron or semi-finished steel. The Pig Iron Syndicate to-day adopted its scale for the second half year; no changes were made except an advance of 1 mark per ton for Nos. 1 and 3 foundry for central Germany and Saxony. One of the furnace companies situated on the seacoast favored a general advance in view of the fact that ores and coke have both been raised since the present iron prices were fixed. The great majority, however, thought it wisest to exercise self-restraint in view of the indications of weakness in other sections of the trade. The syndicate is still unable to meet its engagements on time, having recently bought a considerable quantity of English iron with which to fill orders of some of its foreign customers, so that it might liberate an equal quantity for German buyers. The syndicate has received many inquiries for the last half of the year, and it is expected that buying will proceed with a rush in the next week or two. It is even predicted that within two weeks the entire make of the furnaces for the second half-year will be practically sold out. One of the important events of the week was the prolongation of the syndicate to 1917, which means the addition of two years to its existence under the present contract. This news created a good impression on the stock exchanges and went far toward neutralizing the effect of the price reductions mentioned.

According to some reports the demand for bars has improved within a week or two. Dealers, however, as is admitted, are still showing the greatest reserve. It is mentioned that their stocks are running pretty low, and that they are gradually being compelled to give orders for replenishing them. The mills are reported as still having orders ahead for at least three months. A certain confidence in respect to the price situation is evident in the trade: producers are looking for a considerable increase of new business within a few weeks now that the money markets have grown much easier and the outlook for an early peace is brighter.

The Steel Works Union report shipments of about 563,000 tons in March of semi-finished steel, rails and structural shapes. This was 57,000 tons more than in February but 108,000 tons less than in March, 1912, when the movement was artificially stimulated by the fact that the union had adopted April 1 as the beginning of its business year and the mills were cleaning up old contracts. The present business year ends with June.

March shipments of wire rods by the association showed for the first time a marked drop, having amounted to 38,000 tons against 42,000 for February. Another meeting was held yesterday looking toward the prolongation of the association, but no result was reached. The situation has grown worse, fresh difficulties having

arisen. Another effort will be made in May to reach an agreement.

From the Silesian district it is reported that several of the chief local mills have received large orders from Japan and China for tubes, plates and other steel products.

The downward movement in Belgium is making further progress. At the end of last week the export price of heavy plates was reduced 1 shilling to 127 to 128 shillings; medium grades 1 shilling to 130 to 132 shillings; steel bars 2 shillings to 113 to 115 shillings, and iron bars to 114 to 116 shillings. A dispatch of to-day from Antwerp states that steel bars have declined to 112 shillings, while German export offers are in the market at 115 to 116 marks. The dispatch adds that the reserve of consumers has grown more pronounced.

According to news from Sweden the Government has brought in a bill for increasing the quota of iron ores to be exported annually by 300,000 tons. As Germany is the largest consumer of Swedish ores some of the manufacturers are expecting to profit by this increase.

## British Business Restricted

Cleveland Pig Iron Higher, with Shorts Still Covering—Steel Billets Weak  
(By Cable.)

LONDON, ENGLAND, April 22, 1913.

Shorts in Cleveland pig iron warrants are still covering quietly. The squeeze threatens to last until late next month. For three months' delivery warrants are quoted about 63s. Stocks of warrant iron are 210,864 tons, against 211,558 tons one week ago.

New buying continues restricted. Semi-finished steel is weak, with cheap French offers and Germans not quoting. We quote as follows:

Cleveland pig-iron warrants (closing Tuesday), 68s. 10½d., against 66s. 1½d., one week ago.

No. 3 Cleveland pig-iron makers' price, f.o.b. Middlesbrough, 69s. 3d., against 66s. 6d., one week ago.

Ferromanganese, £11 12s. 3d. f.o.b. shipping port.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 10s.

German sheet bars, f.o.b. Antwerp, nominally 103s..

German 2-in. billets, f.o.b. Antwerp, nominally 100s.

German basic steel bars, f.o.b. Antwerp, £5 15s.

Steel bars, export, f.o.b. Clyde, £7 17s. 6d., a decline of 2s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Brimsby, £7 5s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel strip plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 3d., an advance of 3d.

(By Mail)

Pig-Iron Consumers Not Yet Buying—Conditions Regarded as Critical

LONDON, April 12, 1913.

The long expected buying movement in pig iron by consumers has not yet matured, and the volume of new business alike in foundry and forge irons and in hematite remains of the smallest, consumers all round professing the firmest belief that prices are too high and that a reduction must occur very soon. The business that has been actually closed is practically all for immediate delivery, and blast furnace owners are getting anxious now to book forward contracts. The vagaries of the Cleveland warrant market have continued to produce unsettlement. There is not the smallest doubt that the continued manipulation which has been seen has had the effect of stopping buying, and has thus had a very direct influence in producing the trade reaction which has been in progress here all the year. Possibly if the movement collapsed (and recent indications have rather pointed this way), genuine trade buying might yet recover and part of the ground which has been lost might thus be recovered. The time is rather a critical one, however, owing to the much less favorable sentiment which prevails.

### The Standard Oil Tin Plate Order

The purchase by the Standard Oil Company of a line of Welsh timplates, as advised you by cable, was

totally unexpected, and it was part of the irony of fate that the order should have been placed with the firm whose jeremiads have been so fully reported in the tariff reform press. The fact of the matter was that the buyers were apprehensive that the floods which had interfered with production at some of the American mills would delay deliveries to a serious extent, and to protect themselves against possible loss and inconvenience they resolved to enter the Welsh market. The business was kept very quiet, indeed, but of course it leaked out within a few days and has infused fresh hopes that the 60,000 box order will be but the forerunner of others. It would hardly do to be too sanguine on this score when all the circumstances are considered. The Welsh tin plate trade is slowly, very slowly, recovering itself. About 10 mills are idle and of course there is now a strengthening of the statistical position in progress, but the stocks at Swansea are still exceedingly heavy and already financial trouble has overwhelmed a plant of modern construction.

#### Lower Prices for Semi-Finished Steel

The situation in semi-finished steel has long been precarious, though the largest Continental sellers have been unwilling to admit the fact which was patent to many onlookers. Inquiries, taking the year as a whole, have been of the most niggardly character, and evidently only for the purpose of keeping plants going. The buying of tin plates and galvanized sheets has been poor throughout and this has acted as a detriment upon new buying of steel. With the semi-paralysis of the tin plate trade there was at once a sharp break in Welsh bars, which went down to £5 5s, while many small lots were done at 2s 6d above this figure. This reacted on the Midland districts, and the consequence was that with local prices far below those asked for foreign material the latter was knocked out of the market. Then the Belgians cut prices for heavy slabs and blooms and the French cut below them. Last week French material of this character could have been got at 101s, if not less, while it would have been perilous to bid that figure for Belgian unless the bidder were prepared to take the steel. The knowledge that matters were developing in this way startled the German Verband and this week it has come out of its shell and put rates down by fully 2s 6d a ton, though whether this will do any good remains to be seen. The curious thing is that the home trade in the Fatherland seems to be pretty good for half-finished material. There are always undercurrents at work, however, and it is not always an easy task in the present circumstances prevailing in German industrial circles to get at the bottom of things. Home and foreign politics and the European war cloud, which still lowers ominously, conspire to engender greater caution than usual in discussing industrial conditions and economics, and ugly rumors have been afloat as to the real reason for the terrific rush in evidence at all German steel works, where large numbers of men are engaged, to clear off the orders in hand.

#### St. Louis

ST. LOUIS, Mo., April 21, 1913.

There has been some improvement and an increase in activity except in scrap material. In general, volume and tendencies are better than a week ago.

**Pig Iron.**—An increase in inquiries, both in number and in size, has given encouragement to furnace representatives that the buying movement expected is about to set in. There is a firmness in quotations which has not been noticeable recently, and while \$12.50 for No. 2 Southern, Birmingham basis, is the low figure the tendency is to make the quotation \$12.50 to \$13 to have a range for negotiation. Sales for the week were chiefly in small lots, as has been the case, but the aggregate has been greater and interest is more active. The largest sales were one of 1000 tons No. 3 Southern; one of 250 tons No. 2 Southern; one of 650 tons of Northern car-wheel iron and several lots of 100-ton and 50-ton size. Inquiries include one for 1500 tons and 1000 tons of No. 2 Southern for last half delivery. The sales noted were all for prompt shipment, not later than the close of the present quarter. Offerings for last half are free in some quarters at \$13.50, but no new business has been developed.

**Coke.**—The continued inability to get shipments is causing considerable nervousness on the part of consumers. Quotations under such conditions are not strictly representative. One large contract is reported under negotiation with details withheld.

**Finished Iron and Steel.**—Bookings would probably be much larger if prompter deliveries could be made and if the mill representatives actively sought new business backed with assurances of such deliveries. Consumers under contract continue to take all they can get and are specifying ahead to a very large extent, evidently being in need of the material and determined to assure deliveries as far as they are able to do so. This relates to structural steel especially. Fabricating shops are busier than ever in preparation for spring and summer work. The Missouri Pacific is negotiating for rails, probably about 25,000 tons. Reinforcing bars are in good demand. There is a mill tendency to hold implement and wagon interests down to six months' contracts. Track fastenings are in good request. Conditions generally are encouraging. The only large structural material contract in sight, and that some distance away, is for a 16-story hotel and theater building, the financing of which is about completed.

**Old Material.**—Dealers are doing no more than fill the wants of customers as they develop. The mills are all out of the market and in consequence prices show a softening tendency. The only list out during the week was one for 400 tons from the Chicago & Eastern Illinois, which went at reduced figures. Relaying rails show no life and generally the market is in a moribund state. We quote dealers' prices, f.o.b. St. Louis, as follows:

#### Per Gross Ton.

Old iron rails .....	\$13.00 to \$13.50
Old steel rails, rerolling .....	13.25 to 13.75
Old steel rails, less than 3 ft. ....	11.50 to 12.00
Relaying rails, standard section, subject to inspection .....	22.50 to 23.50
Old carwheels .....	14.50 to 15.00
Heavy melting steel scrap .....	11.25 to 11.75
Frogs, switches and guards, cut apart .....	11.00 to 11.50

#### Per Net Ton.

Iron fish plates .....	\$11.50 to \$12.00
Iron car axles .....	19.50 to 20.00
Steel car axles .....	17.00 to 17.50
No. 1 railroad wrought .....	11.25 to 11.75
No. 2 railroad wrought .....	11.00 to 11.50
Railway springs .....	9.50 to 10.00
Locomotive tires, smooth .....	11.00 to 11.50
Wrought arch bars and transoms .....	14.00 to 14.50
Steel couplers and knuckles .....	9.50 to 10.00
No. 1 dealers' forge .....	8.00 to 8.50
Mixed borings .....	6.00 to 6.50
No. 1 busheling .....	9.75 to 10.25
No. 1 boilers, cut to sheets and rings .....	6.50 to 7.00
No. 1 cast scrap .....	9.00 to 9.50
Stove plate and light cast scrap .....	8.00 to 8.50
Railroad malleable .....	9.50 to 10.00
Agricultural malleable .....	8.00 to 8.50
Pipes and flues .....	6.50 to 7.00
Railroad sheet and tank scrap .....	6.00 to 6.50
Railroad grate bars .....	7.00 to 7.50
Machine shop turnings .....	7.00 to 7.50
Bundled sheet scrap .....	6.00 to 6.50

#### Buffalo

BUFFALO, N. Y., April 22, 1913.

**Pig Iron.**—Inquiry has slackened perceptibly, and sales did not aggregate over 10,000 tons of all grades. It is reported that sales of 2X foundry have been made at \$15.50 by one of the selling interests in a few instances for the larger tonnages, but the majority of the producing interests are quoting \$16 and do not consider sales made below that figure sufficient to establish the market. We therefore quote the price schedule shown below for second quarter and second half delivery, f.o.b. Buffalo, as fairly representing sellers' prices:

No. 1 foundry .....	\$16.25 to \$16.50
No. 2 X .....	16.00
No. 2 plain .....	15.75 to 16.00
No. 3 foundry .....	15.50 to 16.00
Gray forge .....	15.50 to 15.75
Malleable .....	16.00 to 16.50
Basic .....	16.25 to 17.00
Charcoal, regular brands and analysis .....	18.00 to 19.00
Charcoal, special brands and analysis .....	21.50

**Finished Iron and Steel.**—Specifications show a slight falling off in most lines since the first of the month, as compared with the previous month, but they are not below production and the price situation is strong and well maintained. In iron bars good demand is shown, largely because better deliveries can be obtained than in steel bars. Considerable trade is reported in reinforcing bars, and one inquiry for 800 tons of twisted bars is reported as under negotiation. Business is also good in bolts, nuts and spikes at firm prices. Black and galvanized sheets show active demand at well-maintained prices and with fairly prompt deliveries. In fabricated structural material it is ex-

ceedingly difficult to obtain nearby deliveries on new business, and considerable placements are already being made for deliveries running into the early part of 1914. Bids are being taken this week for a club house for the Order of the Orioles, Buffalo, requiring 200 tons and for a Lion House for the Delaware Park "Zoo," 100 tons. Bids are to be received about May 1 for a high school building with boiler house at Williamsport, Pa., from plans of Architect E. E. Joralemon, Buffalo, requiring 600 tons. The Riverside Bridge Company, Wheeling, W. Va., has the contract for the 900 tons for the water works pumping house, Buffalo, and the Farrar Iron & Steel Works, Buffalo, for 240 tons for the valve and meter house. The Buffalo Structural Steel Company has 150 tons for a store and loft building for A. B. Little on Washington street, Buffalo, and the Eastern Concrete Steel Company, Buffalo, 150 tons for the Michael Theater on Allen street.

**Old Material.**—Demand for iron and steel turnings has fallen off and prices for that commodity have declined. Clean cast borings continue in fairly good demand at about the same price as last week. In heavy melting steel the principal local user is still out of the market and practically the only demand in this line is from outside districts and is of small volume. Transactions have been light. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel .....	\$12.00 to \$12.75
Boiler plate, sheared .....	15.00 to 15.50
No. 1 busheling scrap .....	11.50 to 12.00
No. 2 busheling scrap .....	9.00 to 9.50
Low phosphorus steel .....	17.00 to 17.50
Old iron rails .....	15.00 to 15.50
No. 1 railroad wrought .....	14.00 to 14.50
No. 1 railroad and machinery cast scrap .....	13.75 to 14.25
Old steel axles .....	17.50 to 18.00
Old iron axles .....	24.00 to 24.50
Old carwheels .....	15.00 to 15.50
Railroad, malleable .....	13.25 to 13.75
Locomotive grate bars .....	10.50 to 11.00
Stove plate (net ton) .....	9.75 to 10.00
Wrought pipe .....	10.00 to 10.50
Wrought iron and soft steel turnings .....	7.00 to 7.50
Clean cast borings .....	8.00 to 8.25
Bundled tin scrap .....	17.00

## New York

NEW YORK, April 23, 1913.

**Pig Iron.**—Outside of a few orders of 100 tons for early delivery, the market is without any show of activity. Some inquiry for forward delivery has been made and representatives of selling firms have been sounding the trade, but buyers have not yet made up their minds to cover for iron they will need late in the year. The low prices made on a few good sized sales ten days ago have rather limited than stimulated business. It may be, as some sellers contend, that buyers will shortly be in the market by scores at one time, with good chances of advancing prices by their simultaneous demand, but the latter seem willing to take his risk for a further interval. Quotations made in New England indicate that on large lots \$15.50 at Buffalo can be done for No. 2 X, that the Virginia furnace price lately prevailing, which has been around \$15, can be cut to \$14.75, and that eastern Pennsylvania furnaces would quote \$16 on closely competitive business. The conditions as to prices are, therefore, substantially as they were one week ago. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$17.50 to \$17.75; No. 2 X, \$16.75 to \$17.25; No. 2 plain, \$16.50 to \$16.75. Southern iron is quoted at \$17.50 to \$17.75 for No. 1 foundry and \$16.75 to \$17.25 for No. 2.

**Structural Material.**—Railroad offerings continue to be prominent, but New York itself is relatively dull, with low fabrication and erection prices, except for construction requiring early completion, when better prices seem to be obtained, as would be expected. In the Middle West bridge replacement inquiries are appearing, notably from the Big Four. The delay in settling some of the large building projects and the decrease in the number of fresh building movements has resulted in few of the fabricating concerns being scheduled for more than two months. One recent building is said to have brought a price for the erection complete at about \$48 per ton, against \$56 or \$58, an earlier quotation for similar work. The awards of the week include 600 tons for the New York Central terminal area to the American Bridge Company; 1000 tons for an extension to the power plant of the Philadelphia Rapid Transit to the Phoenix Bridge Company; 500 tons for an apartment house on West Fifty-first street to the Passaic Steel Company; 250 tons for an apartment house on West Eighty-first street to Ravitch Brothers; 225 tons for

the New York Central at Otis, N. Y., to the Fort Pitt Bridge Company; 475 tons for the New York Central at Guilderton, N. Y., to the Pennsylvania Steel Company, and 880 tons for a high school in Flushing, N. Y., has also been closed. The Noelke-Richards Iron Works has taken 1200 tons for the Gwynne building, Cincinnati. It is understood that about 5000 tons of sheet piling is to be bought for Erie canal work near Rochester and 2000 tons of sheet piling has been taken by the Carnegie Steel Company for Federal work at Troy, N. Y., in connection with a dam. The interesting feature of the prices for plain material is that while small lots from store command 2.15c., New York, relatively early shipment from stock from some steel companies can be obtained at 1.60c. to 1.75c., Pittsburgh; there are other companies supplying the plain material at 1.60c., Pittsburgh, for delivery in a few weeks; from other sources at somewhat longer delivery the price is 1.55c.; while delivery late in the third quarter can be obtained for 1.50c., Pittsburgh, with 1.45c., Pittsburgh, for the last quarter.

**Plates.**—The New York market is dull, but the Eastern mills seem to have taken on more business, as deliveries with them range in different cases from two to four and more weeks. Their prices still are 1.60c., Pittsburgh. There is still prompt delivery business urged on the plate mills and quite a number of tons was recently closed for shipment in a week at 2½c. per lb. There has been another spurt in car buying. The Pullman Company has taken the 201 passenger equipment cars for the Harriman Lines and 25 for the Illinois Central and 17 for the Central of Georgia. The Pressed Steel Car Company has closed for 50 general service cars for the Havana Central and for 500 cars and 250 flat cars for the Seaboard Air Line, while this railroad has given the Standard Steel Car Company 300 hopper cars. The Pressed Steel Car Company has also taken 4000 to 4600 cars for the Grand Trunk, 3000 of these box cars and the remainder general service cars. The Frisco System is inquiring for box, gondola and hopper cars, in equal amounts totaling 3000. The Wabash is expected to buy 1000 hopper cars and the Baltimore & Ohio, it is thought, will soon close for 50 passenger equipment cars. Car deliveries are now for fourth quarter. Quotations remain at 1.61c. to 1.66c., New York, for mill shipments in fourth quarter, and 1.76c. for shipment in two to four weeks.

**Bars.**—New inquiry has dropped off and specifications on contracts are not so heavy. Jobbers' stocks do not seem to have increased to any extent and practically all of the shipments on low-priced material have been made, so that the position of the market is strong in this respect, especially in view of the loaded condition of the bar-mill order books, with many of the larger makers forced to refuse business which would ordinarily be satisfactory. Bar-iron has been ordered in better volume. Steel bars are quoted at 1.56c., New York, for delivery four and more months hence, while refined iron bars are held at 1.65c. to 1.75c., New York. Store prices for steel bars are 2.05c. and for iron bars, 2.10c.

**Cast Iron Pipe.**—John J. F. Mulcahy, 165 Broadway, was the low bidder on section 1, which is much the larger part of the contract for the extension of the New York City high-pressure fire protection system, when proposals were opened April 21. At this writing he has not purchased the pipe which he will require. Mexico, N. Y., will open bids May 7 on pumps and other apparatus required for a waterworks system, including 860 tons of large-sized cast-iron pipe and a quantity of small pipe for lateral mains. While private buying continues to some extent this class of trade shows no snap, probably due to expectations of lower prices because of the weakness in pig iron. Prices on carload lots of 6 in. run from \$23.50 to \$25 per net ton, tidewater,

**Ferroalloys.**—With the market quiet 80 per cent. ferromanganese is unchanged at \$61, Baltimore, for all deliveries. There is not enough business to indicate how far resale or speculative lots remain a factor. The call for 50 per cent. ferrosilicon is quiet also at \$75, Pittsburgh, for carloads, \$74 for 100 tons and \$73 for 600 tons and over.

**Old Material.**—The market is without animation. Consumers appear to be making no inquiry, having persistent offerings from dealers who are in possession of ample stocks. Steel works in this territory are apparently well supplied with scrap and will only buy when tempting offerings are made. Rolling mills are doing little in the market, but No. 1 railroad wrought maintains exceptional strength. A few foundries have taken fair quantities of cast scrap, but no general buying is found in this section of the market. Dealers' quotations

are as follows, per gross ton, New York City and vicinity:

Old girder and T rails for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap .....	10.50 to 11.00
Relying rails .....	22.00 to 22.50
Rerolling rails (nominal) .....	14.00 to 14.50
Iron car axles .....	24.00 to 24.50
Old steel car axles .....	15.75 to 16.25
No. 1 railroad wrought .....	13.25 to 13.75
Wrought-iron track scrap .....	12.25 to 12.75
No. 1 yard wrought, long .....	12.00 to 12.50
No. 1 yard wrought, short .....	11.00 to 11.50
Light iron (nominal) .....	4.50 to 5.00
Cast borings .....	7.75 to 8.25
Wrought turnings .....	8.00 to 8.50
Wrought pipe .....	10.50 to 11.00
Old earwheels .....	14.00 to 14.50
No. 1 heavy cast, broken up.....	11.25 to 11.75
Stove plate .....	8.75 to 9.25
Locomotive grate bars .....	8.00 to 8.50
Malleable cast .....	11.00 to 11.50

Crocker Brothers have removed their offices from 99 John street to the Forty-second Street Building, 30 East Forty-second street, near Grand Central Terminal, New York.

## Metal Market

NEW YORK, April 23, 1913.

### The Week's Prices

Cents Per Pound for Early Delivery.	Lead						Spelter
	Copper, New York	Electro- lytic, New York	Tin, New York	New St. Louis	New York	St. Louis	
April Lake.							
17.....	15.75	15.62½	50.10	4.35	4.25	5.70	5.55
18.....	15.75	15.62½	50.10	4.35	4.25	5.70	5.55
19.....	15.75	15.62½	....	4.35	4.25	5.70	5.55
21.....	15.75	15.62½	49.45	4.35	4.25	5.65	5.50
22.....	15.75	15.62½	49.45	4.50	4.37½	5.60	5.45
23.....	15.75	15.62½	49.75	4.50	4.37½	5.60	5.45

Copper maintains its strength although business is lacking. Tin prices hold up but the demand is light. Lead is higher and quiet. Spelter is lower and dull. Antimony is inactive and otherwise unchanged.

### New York

**Copper.**—The good buying on the part of both domestic and foreign consumers tapered off last week and the situation has been dull for some days. Although prices have held up there is little new business in view and few predictions are heard as to the immediate course of the market. It is pointed out that in the recent buying movement a great deal of copper was purchased and also that such heavy buying cannot be expected to continue without intermission. Electrolytic copper is quoted to-day at 15.75c., delivered, 30 days, or 15.62½c., cash, New York. Lake is quoted from 15.75c. to 16c., cash. It is reported that Lake was sold for export the latter part of last week on a basis of 16c., delivered. Yesterday a weaker tendency developed in London, but this has not been reflected here. The exports this month aggregate 22,936 tons. The quotation in London this morning is £67 18s. 9d. for spot and £68 3s. 9d. for futures.

**Pig Tin.**—This metal has been exceptionally dull. In fact, those in the trade use the word "stagnant" in describing the market. They estimate that not over 200 tons, including both spot and future delivery, has been traded in during the week. The prices quoted continue below the import cost and this of itself is pointed to as a conclusive indication of the lack of demand. Consumption is going ahead at a good rate, and consumers are well supplied as the result of their heavy buying a few weeks ago. At the same time it is stated that consumers overbought in recent weeks and the actual consumption has not been as great as was reported although it unquestionably has been good. Tin is quoted to-day in New York at 49.75c., while the London quotations are £228 10s. for spot and £224 for futures. The arrivals this month total 2615 tons and there is afloat 2280 tons.

**Lead.**—The price was advanced from 4.35c. to 4.50c., cash New York, yesterday by the American Smelting & Refining Company. Prices have been regarded as low and it has been repeatedly said that were it not for the proposed tariff changes the metal would advance. Apparently the large interest referred to concluded the price could safely be advanced, despite the expected change to a 25 per cent. ad valorem duty. Demand was fair last week, coming from dealers and consumers, but has quieted down. Lead is quoted at £18 a ton in London, but this price is said to have none but a sentimental effect on American prices. The St. Louis price is 4.37½c.

**Spelter.**—The tendency toward increasing weakness has been steady and to-day, with practically no business, the metal is quoted at 5.60c. to 5.55c., New York,

and 5.45c. to 5.50c., St. Louis. Large quantities are being used by both brass mills and galvanizers, but the deliveries are nearly all against old contracts. Sellers of the better grades are practically out of the market, awaiting higher prices. Manufacturers of sheet zinc have reduced their price ¼c. per lb.

**Antimony.**—With heavy contracts still running and present quotations below import cost, there is little or no activity in antimony and none is expected until conditions have bettered and possibly until the new tariff bill becomes law. Quotations are unchanged at 9c. for Cookson's, 8.50c. for Hallett's and 7.50c. to 7.62½c. for Chinese and Hungarian grades.

**Old Metals.**—The demand is only fair. Dealers' selling prices remain unchanged as follows:

	Cents per lb.
Copper, heavy and crucible .....	15.25 to 15.50
Copper, heavy and wire .....	14.75 to 15.00
Copper, light and bottoms .....	13.75 to 14.00
Brass, heavy .....	10.00 to 10.25
Brass, light .....	8.50 to 8.75
Heavy, machine composition .....	13.75 to 14.00
Clean brass turnings .....	8.75 to 9.00
Composition turnings .....	11.50 to 12.20
Lead, heavy .....	4.00
Lead, tea .....	3.75
Zinc, scrap .....	4.75

### Chicago

**APRIL 21.**—The past week has been one of little activity in non-ferrous metals. No quotable changes are noted, though tin prices were at one time during the week 1c. per lb. higher than at this date. The principal interest continues to quote the same prices for lead, but outside sellers are asking an advance. The spelter market has been quiet and the prices quoted are nominal. In scrap metals some additional advances are shown. We quote as follows: Casting copper, 15.50c.; Lake, 15.75c., in carloads for prompt shipment; small lots, 5c. to 5½c. higher; pig tin, carloads, 50.75c.; small lots, 52.75c.; lead, desilverized, 4.30c. to 4.35c. for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.75c. to 5.85c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is \$8, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals, we quote buying price for less than carload lots: Copper wire, crucible shapes, 13.75c.; copper bottoms, 12.50c.; copper clips, 13.25c.; red brass, 12.75c.; yellow brass, 9.50c.; lead pipe, 3.80c.; zinc, 4.35c.; pewter, No. 1, 33c.; tinfoil, 38c.; block tin pipe, 44c.

### St. Louis

**APRIL 21.**—A firmer tendency is noted, except as to spelter. Lead closed the week at 4.25c.; spelter, 5.50c. to 5.55c.; tin, 50.35c. to 50.60c.; Lake copper, 16.22½c.; electrolytic copper, 16.10c.; antimony, Cookson's 9.35c. The depression in spelter has not extended to the Joplin ore market. Zinc blende prices were quite firm on a basis of \$44 per ton for 60 per cent. with the choicest lots going as high as \$47. The range was down as low as \$40, but little was sold at that price. Shipments were heavy. Calamine was quiet at \$20 for 40 per cent. the choicest lots bringing up to \$25. Lead was better at \$53.50 for 80 per cent. Miscellaneous scrap metals we quote as follows: Light brass, 6c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 11c.; zinc, 3.50c.; lead, 3.50c.; tea lead, 3c.; pewter, 25c.; tinfoil, 34c.

Germany continues to increase its output of pig iron. The production established a new record in March, with 1,628,190 metric tons. This exceeded the previous high record, that of January, by 18,476 tons, and it was 204,000 tons more than for March, 1912.

A number of sales managers of the Carnegie Steel Company are now in attendance at a two weeks' instruction meeting in the Pittsburgh district, the work being divided between the mills and offices.

A fire at the fabricating plant of the McClintic-Marshall Construction Company, Rankin, Pa., in the past week caused considerable damage to power equipment. The power building will need to be rebuilt.

The Exeter Machine Works, Pittston, Pa., has opened a Pittsburgh office at 945 Oliver Building, with S. C. Webb, formerly with the Diamond Machine Company, Monongahela, Pa., as manager of sales.

No. 1 Crane furnace of the Empire Steel & Iron Company at Catasauqua, Pa., was blown out last week.

## Iron and Industrial Stocks

NEW YORK, April 23, 1913.

Transactions in stocks are light and values of most securities show narrow fluctuations. The market is so dull that in a number of stocks days pass within a single transaction. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.....	33½ - 35½	Railway Spring, com	31½ - 33½
Am. Can, pref....	93½ - 95½	Republic, com.....	25 - 25½
Am. Car & Fdy., com.	50½ - 51½	Republic, pref.....	84 - 84½
Am. Car & Fdy., pref.	114 - 115	Rumely Co., com....	30 - 35½
Am. Loco., com....	36 - 36½	Rumely Co., pref....	70½ - 74½
Am. Loco., pref....	193½ - 103½	Sloss, com.....	35 - 35½
Am. Steel Foundries	34 - 35	Pipe, com.....	14
Bald. Loco., com.....	46	Pipe, pref.....	50½
Bald. Loco., pref....	104½ - 104¾	U. S. Steel, com....	61½ - 63½
Beth. Steel, com....	34 - 34½	U. S. Steel, pref....	107½ - 109
Beth. Steel, pref....	70½ - 71	Westinghouse Elec.	63 - 64½
Colorado Fuel.....	33 - 34½	Am. Ship, com.....	52 - 54
Deere & Co., pref....	97½ - 97½	Am. Ship, pref.....	102
General Electric....	139 - 141½	Chic. Pneu. Tool.....	50½
Gr. N. Ore. Cert....	34½ - 36	Cambria Steel.....	50½ - 51
Int. Harv., new....	104½ - 105½	Lake Sup. Corp.....	28½ - 28½
Int. Harv., new, pref....	112	Fa. Steel, pref.....	75
Int. Harv. Corp.....	104	Warwick.....	10½ - 10½
Int. Harv. Corp., pref....	112½	Crucible Steel, com....	15 - 15½
Int. Pump, com.....	10	Crucible Steel, pref....	91 - 91½
Int. Pump, pref.....	38½	Harb. Wk. Ref., com....	47½
Lackawanna Steel.....	40	Harb. Wk. Ref., pref....	100
Nat. En. & St., pref....	85	La Belle Iron, com	42½ - 46
Pressed Steel, com....	26 - 26½	La Belle Iron, pref....	124 - 125

### Dividends Declared

The Dominion Steel Corporation, regular quarterly, 1½ per cent. on the preferred stock, payable May 6.

The Cambria Steel Co., regular quarterly, 1¼ per cent., payable May 15.

The United States Metal Products Company, regular quarterly, 1 per cent. on the common stock.

The American Steam Gauge & Valve Mfg. Company, regular quarterly, \$1.75 on the preferred stock, payable May 1.

The Pennsylvania Steel Company, 1½ per cent. on the preferred stock, payable May 1. As 3½ per cent. was paid last November, this makes a rate of 5 per cent. for the twelve months.

The Standard Roller Bearing Company, dividend at the rate of 7 per cent. per annum on the first preferred cumulative stock of that company, paid April 15. This stock was subscribed less than a year ago and the dividend covers the period from the time of subscription to April 1.

## Personal

J. K. Pollock, of Rogers, Brown & Co., Cincinnati, Ohio, sails from New York this week on the Cincinnati, of the Hamburg-American Line, for a two months' stay abroad.

A. A. Fowler, of Rogers, Brown & Co., New York, has just returned from a business trip to England. He found the sentiment more general there that the height of the British iron trade boom has been passed, though there is still plenty of work at shipyards, with promise of good employment of steel works for some months to come.

W. E. Berg has been appointed chief engineer for the Colorado Fuel & Iron Company, Minnequa Works, Pueblo, Colo.

H. K. Gilbert, president Vulcan Engineering Sales Company, Chicago, sailed from New York April 22 for a two months' sojourn in Europe in the interests of his company.

Richard Pyle, formerly of the Rodgers Boiler & Burner Company, Muskegon, Mich., has been appointed Pacific coast representative and special director for the Muskegon Boiler Works.

The Cambria Steel Company has elected the following officers: W. H. Donner, president, headquarters in Pittsburgh; J. L. Reagle, vice-president and general manager of sales, headquarters in Johnstown; E. E. Slick, vice-president and general manager in charge of operations, headquarters in Johnstown; W. S. Robinson, vice-president and in charge of treasury department and stock transfers, headquarters in Philadelphia.

Prof. Albert Sauveur, Cambridge, Mass., who has been made vice-chairman of the iron and steel committee of the American Institute of Mining Engineers, will be in charge of the committee's work in the absence of the chairman, Charles Kirchhoff, in Europe. J. E. Johnson, Jr., William Kelly and William R. Walker have recently been added to the committee.

H. G. Stalnaker, who has been assistant manager of the Pittsburgh office of the Ohio Iron & Steel Company, Lowellville, Ohio, has been appointed manager of a new office of the company recently opened at 1112 Citizens' Building, Cleveland.

Capt. Joseph R. Rundle, president Rundle Mfg. Company, Milwaukee, Wis., manufacturer of enameled ware and brass goods, has disposed of his interest in the business to Robert T. Hazlewood, who succeeds to the presidency of the company. Mr. Hazlewood was secretary of the company.

A. W. Moyer, formerly associated with the Rockwell Furnace Company, New York City, has become connected with the Quigley Furnace & Foundry Company, Springfield, Mass., taking charge of the accurate temperature furnace department.

A. L. Kern, who has been identified with the Studebaker Corporation, South Bend, Ind., for a number of years in connection with the designing of dies and tools and the developing of a new steel frame dump wagon, has tendered his resignation to take effect May 1. He has not as yet decided upon his future plans.

Robert H. Norton, formerly with the Seymour Mfg. Company, Seymour, Conn., has taken a position with the Penn Steel Castings & Machine Company, Chester, Pa., as chemist and engineer of tests.

A. M. Hunt, a prominent local consulting engineer, has been appointed chief of the department of machinery of the Panama-Pacific International Exposition, San Francisco. He has been in business in that city since 1894. G. W. Danforth, also a local engineer, will be assistant chief of the department. He has been connected for 10 years with the Union Iron Works.

J. C. Fruitt, president Joliet Bridge & Iron Company, has resigned to accept the position of manager of sales for the Chicago Steel Products Company, Chicago.

F. H. Tackaberry, in charge of sales for the Pennsylvania Steel Company in Mexico City, Mexico, is in the East on a business trip of several weeks.

J. J. F. Mulcahy, 165 Broadway, New York, has formed the firm of Mulcahy & Williams, 168 Madison avenue, New York, which has just taken a contract for the high-pressure fire protection system, district No. 1, New York.

Samuel S. Eveland, of the Eveland Engineering & Mfg. Company, Philadelphia, Pa., leaves for Europe April 24 on important business.

The American Blower Company, Detroit, Mich., makes the following announcement: "The Hon. William C. Redfield, having been appointed a member of President Wilson's Cabinet, has deemed it advisable to terminate his business connections. We have reluctantly accepted his resignation as a vice-president and director and are compelled to announce his retirement from active participation in the management of this company."

## Obituary

STEPHEN A. JENKS, Pawtucket, R. I., of the Fales & Jenks Machinery Company of that city, manufacturer of textile machinery and pumps, died April 17, aged 79 years. A native of Pawtucket, he entered the shops of Fales & Jenks, established by his uncle and father, and learned the various phases of the business, and as a young man was given an interest in the house, with his brothers. Upon the death of the founders they continued the business under the old name. Mr. Fales had not been active in the affairs of the firm for several years.

ROGERS V. SCUDER, vice-president Wesco Supply Company, St. Louis, electrical equipment and supplies, committed suicide April 15 at his home in Kirkwood, Mo., during temporary aberration due to nervous strain from overwork. He was 44 years old and leaves a wife, daughter and son.

The Pawling & Harnischfeger Company, Milwaukee, Wis., is circulating in an attractively prepared pamphlet a description of the methods of machining locomotive cylinders at the West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railroad, using Pawling & Harnischfeger machines for the drilling and boring operations. The article is written by P. G. Valentine of the mechanical engineering department of the railroad.

The National Pipe and Supplies Association held its annual convention at the Hotel Sherman, Chicago, April 14 and 15. With the exception of the opening session, at which the principal address was delivered by Harry A. Wheeler, president of the Chamber of Commerce of United States, the proceedings were conducted in executive sessions. The new officers are: President, William M. Pattison, W. M. Pattison Supply Company, Cleveland, Ohio; first vice-president, A. L. Scott, Pacific Hardware & Steel Company, San Francisco, Cal.; second vice-president, Alexander B. Pierce, N. O. Nelson Mfg. Company, St. Louis, Mo.; treasurer, C. G. Cornell, Jr., Cornell & Underhill, New York City; secretary, George D. McIlvaine, Pittsburgh, Pa.

The Black-Clawson Company, Hamilton, Ohio, has had about 150 men at work in the past week. On April 16 it operated its foundry for the first time since the flood, taking off a good sized heat. The foundry is now in condition to run steadily. The machine shop was put in shape for the operation of half the tools and the remainder will be going before the end of the month. The difficulty now is in getting railroad facilities for incoming and outgoing freight. The company lost part of its office building and a corner of the boiler house. The other damage to the plant was from water and the deposit of mud, as well as the breaking of windows and the washing away of foundry flasks.

The Federal Machinery Company, 115 Broadway, New York City, has been recently incorporated to handle rebuilt and second-hand equipment for contractors and manufacturers. The company plans to take over entire plants and to put the machinery into condition before reselling. Its inception is a recognition of the fact that contractors on large work often sell their outfit, buying again for the next contract, which may be of an entirely different nature or at a distant location. The released equipment will be overhauled or rebuilt at the yard in New Jersey, where it already has engines, locomotives, road rollers, steam shovels, tanks, traction and hoisting engines, hydraulic jacks, pumps, pipe and fittings, portable track, air compressors, dump cars, rails, etc.

G. F. Ahlbrandt, metallurgical engineer American Rolling Mill Company, Middletown, Ohio, assisted by N. W. Collord, treasurer of that company, delivered an address on the "Corrosion of Iron and Steel and the Manufacture of Pure Iron," before the Engineers' Club of Cincinnati on the evening of April 17. Lantern slides were used to illustrate the different processes of manufacture of American ingot iron.

The Post Office Department has awarded to the Triner Mfg. & Scale Company, Chicago, the contract to furnish 25,500 spring scales on account of parcel post at 95c. each, and to the Toledo Scale Company, Toledo, Ohio, the contract to furnish 500 automatic scales for use in the larger post offices of the country at \$19.50 each. Designed especially for parcel post, these scales show not only the weight but the actual amount of postage required to send a package to any of the eight zones at a glance.

Ludwig Löwe & Co., Berlin, Germany, well known in the American machinery trade as among the leading German manufacturers of machine tools, have again declared a dividend of 18 per cent. Profits showed a good increase, but they thought it wise to write off a considerably larger amount than last year. It was decided to enlarge the establishment by erecting two separate shops to be devoted exclusively to making automatic lathes and milling machines.

Arched wooden trusses for the Palace of Machinery, the largest building of its kind ever constructed on the Pacific coast, are now being put in place on the Panama-Pacific International Exposition, San Francisco. There are 125 of these trusses, each weighing four tons. They rise 100 ft. from the floor. It is estimated that 7,000,000 ft. of lumber will be used in their construction.

### The Davis-Brononville Company's Removal

The Davis-Brononville Company, manufacturer of oxy-acetylene welding and cutting apparatus, with general offices for the past six years in the West Street Building, New York, has removed its New York City office to the Hudson Terminal Building, 30 Church street. This affords more convenient communication with the company's general offices and demonstration plant at Marion Station, Jersey City, which are reached by "tube" trains directly from the Hudson Terminal Building to Summit Avenue Station within a few minutes.

The Chicago sales office of the company has been moved from 515 Laflin street to rooms 202-206 Monadnock Block, in the heart of the loop district, and more accessible to those having business with the company in that city.

At the recent annual meeting of the company, the following officers were re-elected: Augustine Davis, president; Harold Rountree, vice-president; C. B. Wortham, secretary and treasurer. N. B. Payne is manager of sales. The directors are: Augustine Davis, C. B. Wortham, W. G. McCune, treasurer of the Otis Elevator Company, New York; Charles J. Mayer, president Electric Service Supplies Company, Philadelphia; Harold Rountree, president National Pneumatic Company, Chicago; DeWitt V. D. Reiley, attorney, New York. Mr. Reiley is legal counselor for the company.

The Chicago Steel Products Company, Chicago, whose offering of \$200,000 of first mortgage bonds secured by the steel fabricating plant acquired from Geo. W. Jackson & Co. marks the completion of that transfer, gives \$780,000 as the value of its real estate, buildings and machinery. The capacity of the plant is 2500 tons monthly and the net earnings during January and February since the new company took hold were slightly in excess of \$12,000. The officers and directors of the company are: President, John G. Kreer; vice-president, L. E. Myers; secretary, W. W. Crawford; treasurer, Chas. H. Wilcox. The directors are Ira M. Cobe, L. E. Myers, Milton J. Foreman, C. H. Wilcox, Dr. O. E. Albright and W. W. Crawford.

The Allis-Chalmers Mfg. Company, Milwaukee, Wis., formally began business April 16 with the assets of the defunct Allis-Chalmers Company, all legal formalities having been complied with and the United States District Court at Milwaukee having approved the deeds in the foreclosure suits. In addition to officers previously mentioned, the directors have chosen the following: Max W. Babb, vice-president and general attorney; L. F. Bower, secretary, and F. Woodland, treasurer, all of Milwaukee.

The Post Office Department states that parcel post stamps with a face value of about \$25,000,000 have been consigned to the various post offices of the country since the installation of the system in January. It further says that "the enthusiastic reception of the parcel post system has made it necessary for the department to double the daily output in order to prevent a possible shortage in stamps."

William Jessop & Sons, Ltd., Sheffield, England, held their sixth annual staff dinner March 29. Chairman A. J. Hobson, in speaking of the two consecutive prosperous years which the company has had, stated that he wished to acknowledge the fact that for its present prosperity it was indebted to its branch works in the United States.

The Columbus Machine & Tool Company was preparing to move a new plant when the flood came. The washing out of railroad tracks made it necessary to haul the entire equipment by wagon to the railroad for loading on cars. The company expects to resume operations within a short time.

The Canton Iron & Steel Company, Baltimore, Md., suffered a loss of probably \$100,000 by fire April 22. Three large buildings were destroyed.

The Cleveland Clutch Company, Cleveland, Ohio, has removed its main office to Ravenna, Ohio.

### The Steel Corporation's Annual Meeting

The annual meeting of the United States Steel Corporation was held in Hoboken, N. J., April 21. The directors whose terms expire this year were re-elected for another three years as follows: E. C. Converse, George W. Perkins, Elbert H. Gary, Henry Phipps, Alfred Clifford and James A. Farrell. Thomas Murray, assistant secretary of the corporation, was made a member of the board to fill the vacancy caused by the death of J. P. Morgan until a permanent successor can be elected.

The meeting was more largely attended than any in several years. Charles M. Cabot, of Boston, a shareholder who introduced a resolution at the meeting two years ago which resulted in the appointment of a committee to investigate labor conditions in the corporation's mills, presented another resolution asking that periodical reports on labor conditions be submitted to the stockholders. Judge Gary favored the proposal, but informed Mr. Cabot that a heavy expense would be incurred if such reports were to be prepared frequently, and the matter was handed over to the Finance Committee for decision.

In regard to complaints which have been made by stockholders that hours of labor in the steel plants are too long, in many cases, Judge Gary said that about 25 percent. of the workmen were working 12 hours a day. Many employees had objected to being deprived of Sunday work, he said, and more than 4000 left last year because of the restriction. He continued:

"As a matter of fact these 12-hour-a-day men are not continuously working 12 hours, but are at the building all the time, and their presence there is required on account of the peculiar work involved in the furnaces.

"We are doing everything possible to better the conditions of our men. I do not think we are entitled to any praise, but I am justified in referring to it for the purpose of showing that we have in mind our employees all the time, and believe we are as much interested in them as any one could possibly be. This question of publishing the facts in regard to our efforts, suggested by the resolution, is a very important one, and yet a very difficult one.

"I am very glad to say that up to the present time we have seemed to satisfy our employees very well. We have endeavored in all the ways practicable from year to year to ascertain the wishes of the large majority, and, more than that, we have endeavored to ascertain for ourselves what is for the best interest of all the stockholders of the corporation.

"Mr. Cabot has been kind enough to say that we have taken the lead in trying to promote the best interests of our employees. I do not know what higher praise the management could have than that, and I think it is justified."

### Electric Steel in England

Another 10-ton Héroult electric furnace was started last week by Vickers, Ltd., at their works at Sheffield, England. It is said to be capable of melting and refining 40 tons of cold scrap per day. This firm has now been producing electric steel for two years. England, as the Iron and Coal Trades Review shows, is not keeping pace with Germany or the United States in the increase in the number of electric furnaces. Germany is continually applying this process to the refining of basic Bessemer steel, and the United States to the manufacture of small castings. Germany has one plant where Héroult furnaces of 28-ton capacity are thus employed and several others of 6 or 7 tons. Tube steel in Italy has been manufactured for several years in furnaces of 6 to 7-ton capacity and it has been recently decided to erect two more of 15 tons capacity for the same purpose.

The output at the Dominion Steel Company's plant at Sydney, Nova Scotia, last month was large. The coke product was 56,300 tons, which is 5300 tons in excess of the best previous record. The new wire drawing mill made a good showing, and the bar mill is doing well. The following are the figures of the March output: Coke, 56,300 tons; pig iron, 31,060 tons; steel blooms, 24,250 tons; steel ingots, 28,430 tons; rails, 15,170 tons; rods, 2300 tons. Shipments were 26,886 tons.

### Iron and Steel Institute Meeting

The annual meeting of the Iron and Steel Institute will be held at the Institution of Mechanical Engineers in London Thursday and Friday, May 1 and 2. At the opening session the Bessemer gold medal for 1913 will be presented to A. Greiner, Société John Cockerill, Seraing, Belgium. The Andrew Carnegie gold medal for 1912 will be presented to J. Newton Friend, Victoria Institute Technical School, Worcester, England. A feature of the meeting is a paper by Benjamin Talbot giving further details of results from his method of producing sound steel by lateral compression of the ingot while the interior is still liquid. It is announced that the autumn meeting of the Institute will be held at Brussels, September 1 to 5. The following papers will be presented at the May meeting:

"Critical Ranges of Pure Iron, with Special Reference to the Point A<sub>2</sub>," By Dr. H. C. H. Carpenter, Manchester.

"Influence of the Metalloids on the Properties of Cast Iron," By H. I. Coe, Birmingham.

"Economy of Dry Blast," by Prof. J. von Ehrenwerth, Leoben.

"Corrodibility of Nickel, Chromium and Nickel Chromium Steels," By Dr. J. Newton Friend, Worcester, J. Lloyd Bentley and W. West, Darlington.

"Influence of Silicon on the Corrosion of Cast Iron," By Dr. J. Newton Friend and C. W. Marshall, Worcester.

"Influence of the Presence of Sulphur Upon the Stability of Iron Carbide in the Presence of Silicon," By W. H. Hatfield, Sheffield.

"A New Form of Electrically-Driven, Two-High, Continuous-Running, Reversing Mill," By Andrew Lamberton, Coatbridge, N. B.

"Studies in the Cold Flow of Steel," By Percy Longmuir, Sheffield.

"Rolling Mill Practice in the United States, Part II," By Dr. J. Puppe, Breslau.

"Faults in Present-Day Furnaces and Their Remedies," By Alleyne Reynolds, Brighton.

"A New Method for Accurate Determination of Phosphorus," By C. H. Ridsdale and N. D. Ridsdale, Middlesbrough.

"Tenacity, Deformation and Fracture of Soft Steel at High Temperatures," By Dr. Walter Rosenhain, Teddington, and J. C. W. Humfrey, Sheffield.

"Chromiferous Iron Ores of Greece," By Herbert K. Scott, London.

"Production of Sound Steel by Lateral Compression of the Ingots While Its Center Is Liquid," By B. Talbot, Middlesbrough.

### Scarcity of Pig Iron and Bar Iron in Russia

The question of lowering import duties on pig iron in Russia is a burning one. The Departmental Conference recently held a meeting to discuss the alleged shortage of pig iron, numerous complaints having been received of scarcity and high prices. Russian pig iron producers denied the existence of any crisis or the necessity of importing iron. It was decided to defer governmental action for two months, but if the deficiency should become acute and prices continue to rise, a new conference will be called to determine whether an urgent bill should be introduced into the legislative department to lower the duties on pig iron.

Iron trade conditions in South Russia are reported to be most prosperous, large dividends being declared in 1912. There is a decided scarcity of ordinary wrought iron squares, rounds, flats, etc., and the question of supply is becoming serious, so much so that machinery manufacturers are feeling the want. The Association of Russian Agricultural Machine Manufacturers proposes to establish new works especially to supply its members with iron and steel. The main cause for this condition is the fact that all the large works which sprang up in South Russia were fitted to produce rails, girders, beams, heavy angles, etc., overlooking the smaller sections.

**New Brunswick Ore for Eastern Furnaces.**—The 52d annual report of the Crown Land Department of the Province of New Brunswick, covering the year ending October 31, 1912, shows that the Canada Iron Corporation, Ltd., has added to its iron mining plant, at a cost of \$60,000, a large concentrator with a capacity of 700 tons per day of 10 hours, and that in the summer of 1912 about 30,500 tons of ore was treated in this mill. A new ore-crushing plant was also installed. Only 5000 tons of ore was mined which, with 60,000 or more left over from the previous year, was shipped to Philadelphia. A contract for the delivery of 200,000 tons for the current year has been made.

## Foreign Metal Working Costs

### Wages in German and English Machine Shops—Tool Steel Prices

In the Daily Consular and Trade Reports of April 16 the following interesting information is presented:

#### Berlin Rates

Consul General A. M. Thackara, Berlin, Germany, says:

According to information obtained from reliable sources, the following are the average wages paid to persons employed in the metal-working industries in Berlin: Per hour—operator of lathe, 14 to 18c; operator of drill press, 11 to 13c; operator of milling machine, 13 to 14c; operator of planer, 14 to 17c; operator of grinder, 14 to 15c; laborers, 11 to 13c. Per week—inspectors, \$11 to \$18; tool makers, \$18 to \$21; blacksmiths and polishers, \$14 to \$21. Per month—foremen, \$54 to \$62; watchmen, \$24 to \$29; shop clerks, \$21 to \$33; bookkeepers, \$29 to \$41; draftsmen, \$43 to \$54.

Each of the employees enumerated above usually works for nine hours daily, regardless of whether he is paid by the hour, week or month. Pieceworkers receive considerably higher wages than those who work by the hour or week. Thus, lathe operators who do piecework may receive a maximum of 23c per hour; drill-press operators, 19c; milling-machine operators, 19c; planer operators, 20c; blacksmiths, 20c, and polishers, 19c.

The average cost to large consumers of machine steel in round bars  $\frac{1}{2}$  in. to  $2\frac{1}{2}$  in. in diameter is \$4.16 per 100 kilos (1.89c per lb.); carbon tool steel of the same dimensions ranges from 21 to 43c per kilo (9.53 to 19.5c per lb.); while the price per kilo (2.2 lb.) of high-speed steel is from \$1.07 to \$2.02 (48.5 to 91.6c per lb.).

#### Frankfort Rates

Consul General H. W. Harris, Frankfort on the Main, Germany, says:

The following rates of wages paid in the metal-working industries of Frankfort on the Main were supplied by the foreman of a local plant: Per hour—operator of lathe, 10c; operator of drill press or milling machine, 12c; operator of planer, 14c; operator of grinder, 19c; toolmakers, 16½c; blacksmiths, 18c; polishers, 14 to 15c; laborers, 10½c. Per week—machinists, \$9.52; inspectors, \$9.52 to \$10.71. Per month—foremen, \$59.50 to \$71.40; watchmen, \$23.80 with lodging; clerks, \$23.80 to \$28.50; bookkeepers and draftsmen, \$42.84 to \$47.60.

An American concern which operates a factory in Germany, though not in this consular district, furnishes the following information concerning wages and cost of materials: Per hour—operator of lathe, 14.3c; operator of drill press, 10.7c; operator of milling machine, 13.1c; operator of planer or of Brown & Sharpe grinder, 11.9c; machinists, inspectors, toolmakers and blacksmiths, 15.5c; polishers, 11.9c. Per day—laborers, 95.2c. Per week—watchmen, \$7.14. Per month—foremen, \$83.30; clerks, bookkeepers and draftsmen, 047.60 to \$71.40.

The average cost to large consumers of machine steel in round bars  $\frac{1}{2}$  in. to  $2\frac{1}{2}$  in. in diameter is \$30.94 per metric ton of 2,204.6 lb., or 1.4c per lb.; of carbon tool steel, \$25.70 per 100 kilos, or 11.65c per lb.; and of high-speed steel, \$1.43 per kilo, or 64.8c per lb.

#### Sheffield Rates

Deputy Consul Luther J. Parr, Sheffield, England, says:

The figures which follow represent the union rate of wages paid most of the workmen listed. The wages paid to inspectors, polishers, watchmen, clerks, bookkeepers and draftsmen are the average rates in this city and vicinity. What is meant by union rate is the maximum amount paid for specific work agreed to by an amalgamated body of workmen.

For a 53-hour week workers in the metal industries of Sheffield receive: Operator of lathe, \$9.50; operator of drill press, \$7.05; operator of milling machine, \$9.50; operator of planer, \$8.50; operator of grinder, \$9.50; machinists, \$6.10 to \$8.50; inspectors, about \$9.75; toolmakers, \$10.20; blacksmiths, \$9.50; polishers, about \$7.30; foremen, \$10.95 to \$12.15; watchmen, \$6.10; laborers, \$5.10; clerks, about \$7.30; bookkeepers, \$9.75 to \$19.45; draftsmen, 10.95.

The average cost to large consumers of machinery steel in round bars  $\frac{1}{2}$  in. to  $2\frac{1}{2}$  in. in diameter is 3c per lb.;

of carbon tool steel, 8 to 12c; of high-speed steel, 24 to 48c. The cost of high-speed steel is from 12 to 97c per lb. according to quality, but medium-priced steel is the kind used in this city for the manufacture of twist drills, i.e., from 24 to 48c per lb.

## Customs Decisions

### Safety Razors

The Board of United States General Appraisers has overruled a contention raised by R. F. Lang, New York, regarding the classification of safety razors minus the blades. They were assessed for duty under paragraph 152 at specific rates according to value as "handles, and unfinished razors." The articles were claimed by the importer to be dutiable at 45 per cent. under the provision for "manufactures of metal." Judge Fischer says in his decision for the board that the terms of paragraph 152 are sufficiently comprehensive to include all descriptions of razors, blades and handles for razors. It is held that the goods were properly assessed.

### Steel Stampings

The board sustained a protest by A. & H. Veith, New York, affecting the rate of duty on steel stampings. They were returned by the collector at 45 per cent. as "manufactures of metal." The importers claimed the goods dutiable at the appropriate rate under paragraph 131, as "pressed, sheared, or stamped shapes of steel." The customs authorities were ordered to reliquidate the entries under the provision claimed.

### Old Type Metal

Pitt & Scott, New York, were successful before the board in a controversy dealing with the classification of merchandise returned by the appraising officers as type metal. Duty was taken at 1½c. per lb. on the lead content under the provisions of paragraph 191. The importers alleged free entry under paragraph 702, which covers "types, old and fit only to be remanufactured." The board rules that the importers clearly proved their case, the collector being reversed.

### Machines Not Machine Tools

The board has acted unfavorably on protests claiming butter churns, mica trimmers, and barking machines to be machine tools dutiable at 30 per cent. The board denies that any of the articles fall within the meaning of the provision claimed. The assessments at 45 per cent. under paragraph 199 as "manufactures of metal" were affirmed. The importers included the Central Vermont Railway Company, John L. Vandiver, and F. W. Myers & Co.

### Manganese Metal

The board has overruled a protest filed by the Goldschmidt Thermit Company, New York, in a case involving the classification of commercially pure manganese metal. It was assessed at 20 per cent. under paragraph 183, as "metal unwrought," and claimed dutiable at \$2.50 per ton under paragraph 118 providing for ferromanganese. The collector of customs informed the board that he was ready to reliquidate the entries on the basis of the lower rate, but the board states in its decision that the collector was misled by the local appraiser's reports concerning the merchandise. The imposition of the higher duty was affirmed.

### Dross of Lead and Tin

The board denied a contention raised by the Union Smelting & Refining Company, relating to the duty on dross of lead and tin. It was returned as "metal unwrought" and taxed 20 per cent. ad valorem. The importations were claimed to be free of duty under paragraph 695, as "grain or granulated tin."

### Scrap Iron from Cuba

The Morton B. Smith Company, New York, was permitted to enter scrap iron of American origin, imported from Cuba, at a discount of 20 per cent. from the regular duty paid thereon by virtue of the reciprocity treaty with Cuba. Free entry also was claimed, but the board held that the importer failed to furnish the official papers required in such cases.

### A New Jersey Iron Mine Strike

The strike of miners at the Mt. Hope iron mines of the Empire Steel & Iron Company near Dover, N. J., which has been on for the past four weeks, is still unsettled. A committee of 12 appointed by the strikers had a conference with President Leonard Peckitt on Friday, April 18, and presented their formulated requests. These call for the reinstatement of all men who had been discharged or who had gone out on strike, all being affiliated with Wharton Union No. 268, of the Western Federation of Miners; recognition of the union, with deduction of dues by the company from the wages of the men and payment by the company to the treasurer of the union; eight-hour shifts (reckoning "from collar to collar") for five days in the week and five hours on Saturday; a 20 per cent increase in wages to all workmen; pay day every second Saturday; the discharge of all strike breakers and employees who continued at work when the strikers went out; the settlement of all grievances by a conference between officers of the company and a committee of five members of the local union, the international officers of the union to be called in where settlements cannot be made locally. There was also a request for a definite statement that trading at the company's stores is optional, also for 90 days' notice to vacate company's houses.

The company in its answer to the men declined to recognize the union. It also said that it could not advance wages at this time, since it had made a voluntary increase on January 15. Assurance was given, however, that after the extensive improvements now under way are completed, the question of further increase in wages would be taken up. The company was willing to grant a fortnightly payday, and to give proper notice for vacation of houses, and it emphasized the fact in its reply that trading at the company's stores had always been optional, and that credit had been regularly extended. It refused to discharge the men then in its employ. While willing to meet a committee of its employees at any time, it stated that it saw no necessity for bringing in outsiders to adjust any matters that might be at issue between the company and its men. The answer of the company was not satisfactory to the strikers and the strike will go on. About 275 men are out, while from 70 or 80 are at work under the protection of company guards and deputy sheriffs.

### The Idle Wire Plant at Corey, Ala.

Allusion was made in these columns a few weeks ago to a set of resolutions passed by the Birmingham, Ala., Chamber of Commerce, which had been forwarded to Chairman E. H. Gary, of the Steel Corporation, urging the operation of the wire mills of the American Steel & Wire Company at Corey, near Birmingham. The resolutions said that there had been a growing feeling of disappointment since the work of equipping the wire mills was stopped and that this had been increased by the announcement that the Steel Corporation would spend many millions on a Canadian steel plant. Recently W. P. G. Harding, president of the First National Bank of Birmingham and of the Chamber of Commerce, went to Washington to confer with Attorney General McReynolds. While the letter written by Chairman Gary in answer to the resolutions of the Chamber of Commerce has not been published, it is evident that some reference was made in it to the pending suit of the Government for the dissolution of the Steel Corporation. At all events, Birmingham papers report that President Harding's call on the Attorney General was to ascertain if possible whether the operation of the wire mill at Ensley would in any sense prejudice the Steel Corporation's position in the Government's suit. It does not appear that any satisfactory answer was given to President Harding's inquiry, though it was intimated that Attorney General McReynolds considered it was not incumbent on the Department of Justice to give advice to corporations prosecuted under the anti-trust act.

It is also stated in Birmingham papers that President Harding called upon Chairman Gary after his Washington visit. Thus far Mr. Harding has declined to give any further information and has said that some statement concerning the matter would probably be issued in the near future from the Steel Corporation offices. Nothing has developed, however, to change the opinion originally

expressed that the cessation of work at the Corey wire plant is directly related to the provision in the Underwood tariff bill putting certain wire products on the free list.

### Experts Testify as to "Machine Tools"

#### Manufacturers Give Customs Board Their Views to Aid in the Adjudication of Many Protests

The Government concluded the taking of testimony in New York April 16, given by a number of machine tool manufacturers and dealers and representatives of other interests in a customs test case involving the determination of what constitutes a machine tool. The Government's witnesses appeared April 15 and 16, the testimony in behalf of the importers having been taken several weeks ago. The immediate hearing was on a case in which entry at 30 per cent. was claimed by an importer of hand power metal-working machines on the ground that they were machine tools. They had been assessed at 45 per cent. by the collector and protests against his actions were filed. Decision is to be made by Board 2, composed of General Appraisers Fischer, Howell and Cooper. The case of the Government was conducted by Martin T. Baldwin, special attorney of the Department of Justice, who contended that the 30 per cent. duty should be confined to such machines as the term "machine tools" implies to the machine tool trade. The case at issue possibly will be the last one of the kind before the enactment of a new tariff act.

#### At Least 50 Cases Are Pending

Mr. Baldwin made the scope of the inquiry very broad, with a view of adducing commercial testimony that can be used in adjudicating some of the 50 or more protests which are pending. Many of the claims in these cases are so untenable that testimony is not considered necessary in their settlement, while others will be decided by precedent already established. Some cases have been awaiting final action for many months. The issue was made in relation to the importation of the following: Pneumatic riveters, rock drills, and machines for making jewelers' chain, metal bottle caps, embroidery, bread, for singeing fabrics, washing kegs, corking wine bottles, mincing meat, making vegetable fibre trimmings, chopping vegetables; also knitting machines, dental drilling machines and machines for shaping and crimping wire.

#### One Point on Which All Agree

The witnesses on both sides in the test case just closed agreed that a machine tool must necessarily be a metal-working machine. The importers' witnesses held that a hand or foot operated machine might be included within the term "machine tool," but this contention the Government's witnesses denied. For the importers there appeared: Felix S. Wiener, Wiener Machinery Company, New York; Ingo Maddaus, Henry Pels & Co., New York; Walter B. Bailey, E. W. Bliss Company, Brooklyn, N. Y.; William Comber, American Metal Hose Company, Waterbury, Conn.; James R. Vandyck, Vandyck-Churchill Company, New York; W. P. Whiting, Prentiss Tool & Supply Company, New York, and L. P. Alford, editor American Machinist. The Government's witnesses included J. W. Carrel, Lodge & Shipley Machine Tool Company, Cincinnati; Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I.; H. W. Breckenridge, Colburn Machine Tool Company, Franklin, Pa.; C. L. Cameron, Gould & Eberhardt, Newark, N. J.; F. W. Parker and C. L. Cornell, of the Niles-Bement-Pond Company, New York, and H. V. Lewis, H. V. Lewis Company, New York.

In connection with this hearing it may be noted that in the new Underwood tariff schedule machine tools are held to mean "any machine operated by other than hand power which employs a tool for working on metal;" also that the United States Court of Customs Appeals has held that "hand power" is synonymous with "foot power" for the purposes of the customs. The text of the testimony taken in the test case will make a good-sized volume. In getting the opinions of the trade Assistant Attorney-General Wemple, whose office is in the United States Appraisers' building, Washington and Christopher streets, New York, sent forms to manufacturers of metal-working machinery with the request that the blanks be filled in with information as to nomenclature accepted in the trade.

# The Machinery Markets

In a majority of the machinery distributing centers trade has been fair, but an increasing feeling of uncertainty as to business prospects in the next few months is to be discerned in some markets, with a consequent tendency to defer buying. In other markets an improvement is noted and manufacturing plants almost everywhere have sufficient orders on their books to keep them going at near capacity. In the New York territory, where a tendency on the part of some small manufacturers to postpone buying is traceable to the pending tariff changes, there is some attractive railroad business before the trade. Philadelphia reports a little better volume of business in small lots and also that the Pennsylvania Railroad is said to have appropriated \$1,000,000 for equipment. In New England there is some uncertainty becoming apparent as a result of the tariff issue, but machinery manufacturing is without any serious abatement in activity. Business is rapidly recovering from the flood in Cleveland, but is not yet fully active, while there is a good demand for cranes, hoists and other handling equipment. In Cincinnati, also, flood damages are being repaired rapidly and the end of the month probably will see all plants in operation. Orders received reached an excellent total in the last week in Cincinnati. Transactions of importance are lacking in Detroit, but a considerable amount of new inquiry is pending. The Chicago trade is figuring on some railroad business. Plants are busy in Milwaukee and the scarcity of skilled labor continues. In the Central South business is rather slow, although conditions resultant from the flood are improving rapidly. In the Birmingham district April has fallen behind the previous month, but is ahead of that of April, 1912. A satisfactory volume of small sales has been the feature in St. Louis. Some depression has been caused in Texas because of weather conditions which are unfavorable to crops. Sales have slackened up on the Pacific coast and there are few inquiries aside from some small ones emanating from railroads.

## New York

NEW YORK, April 23, 1913.

Business is described as fairly good considering the various influences of a detrimental character, such as apprehension over the impending reductions of tariff and labor troubles which are having an effect on various lines of industry. It is pointed out that large enterprises where they have needs are showing little or no restraint in the matter of buying and practically all hesitancy is on the part of the smaller manufacturers. As a general proposition trade is a shade lighter. A few concrete instances have come to light where contemplated purchases which, while not large in themselves are of the satisfactory sort that make up the bulk of trade, have been deferred, even though sales had almost culminated. The reason invariably given has been that the prospective buyers want to see what will develop in the next few months. It should be reiterated, however, that these cases are few and most of those who take the stand referred to are busy. This is in a measure substantiated by the fact that some dealers have found collections from their smaller customers slow, and the latter in asking for extensions say they need the money in their business. Estimates on the extensive requirements of the Pennsylvania Railroad are now in the hands of its purchasing department and reasonably prompt action is not only hoped for, but expected. The list of the Norfolk & Western Railway Company, referred to a week ago, comprises the following machine tools, all of which are to be motor driven, except where otherwise stated:

One 32-in. crank shaper.  
One 1000-lb. single-frame steam hammer.  
One 1½-in. double-head bolt cutter.  
One 1½-in. 6-spindle nut tapper.  
One 90-in. heavy driving wheel lathe.  
One 2½-in. turret lathe for brass work.  
One 18-in. turret lathe for brass work.  
One 72-in. heavy radial drill press. Quotations wanted on semi-universal and universal.  
One emery wheel stand, 2 wheels 18 in. diameter, 2½-in. face.  
One 4-spindle drill press, capacity to 5/8-in. hole.  
One eye-bending machine for smith shop.  
One 18-in. tool room lathe, 3-ft. center, screw cutting and tapering attachment.  
One universal reamer and cutter grinder.  
One 4500-lb. single steam hammer, 42-in. stroke.  
One 1-in. natural wedge grip bolt and rivet header, belt-driven.  
One double-end punch and shear, 15-in. throat.  
One 1-in. double-head bolt cutter, belt-driven.  
One 42 x 42-in. x 12-ft. planer, 2 heads on cross-rail, 2 side heads.  
One Norval high-speed hack saw, belt-driven.  
One No. 2 eye-bending machine. Quotations desired on both belt and motor-driven.  
One 24-in. crank shaper.  
One double-head axle lathe, direct connected.  
One 48-in. carwheel boring mill.  
One 36-in. squaring shear, hand power.  
One 2½-in. outside pipe threading machine for ½-in. to 4-in. pipe, belt-driven.  
One 48-in. carwheel boring machine.  
One 24-in. crank shaper.  
One double-head bolt cutter, capacity ½ to 2½ in.  
One 36-in. sliding head upright drill.  
One 32-in. crank shaper.  
One 36-in. sliding head upright drill press, belt-driven.  
One 24-in. shaper to be belt-driven.  
One 36-in. sliding head upright drill press.  
One double head bolt cutting machine, capacity ½ to 2½ in.

The Howard Miniature Lamp Company, 395 Bank street, Newark, N. J., has begun the erection of a building at Springdale avenue and Nineteenth street, East Orange, N. J.

The Hart Machine Company, Arlington, N. Y., has let contract for the construction of its new plant to Ferguson & Co., Paterson, N. J., and work has been commenced.

The Lewen Steel Corporation, North Pelham, N. Y., recently incorporated, has plans in preparation for a plant for the manufacture of moldless reinforced steel plates, etc. John E. Long, William H. Cutler and Henry L. Rupert, New York City, are the incorporators.

The Cudahy Packing Company, Chicago, is completing arrangements for the building of a grape juice factory at Fredonia, N. Y.

The Appler Refillable Fuse Company, Inc., Syracuse, N. Y., has been incorporated with a capital stock of \$40,000, to manufacture electric fuses, etc. The directors are G. W. Appler, of Lyons, N. Y.; H. C. Beatty, of Skaneateles, and O. J. Loughlin, of Syracuse.

Bids are being received until May 7 by the Board of Water Commissioners of the village of Mexico, Oswego County, N. Y., for the construction and equipment of a waterworks system which will include pumping station, impounding well, steel stand pipe, two power pumps and gasoline engines or electric motors and two steel pressure filters. Also 78 fire hydrants, 71 valves and boxes and about 9 miles of water mains. Witmer & Brown, Chapin Block, Buffalo, are the engineers in charge.

The Chonogen Textile Mills, Inc., Oswego, N. Y., has been incorporated by James A. Shufel, Thomas H. King and Daniel H. Conway, to manufacture knit goods. A plant is being arranged for.

Extensive additions are being made to the manufacturing plant of the Yawman & Erbe Mfg. Company at Gates, N. Y., a suburb of Rochester. The new building will be 84 x 360 ft. with an "L" 84 x 250 ft. of reinforced concrete fireproof construction; the approximate cost will be \$200,000.

The E. Kirstein Sons Company, manufacturing optician, Rochester, N. Y., has let a contract for a four-story and basement factory 63 x 121 ft., to cost \$30,000.

Cordes, Ayrault & Co., North Tonawanda, N. Y., manufacturers of asphalt shingles will build an addition 60 x 150 ft. to its plant on Fillmore avenue. Considerable new machinery will be installed.

The Erie Mop & Wringer Company, Erie, Pa., has completed arrangements for the removal of its plant to North Tonawanda, N. Y., where a site has been selected and a factory will be erected at once.

The R. J. Walters Company, 810 Prudential Building, Buffalo, N. Y., has recently been organized to engage in the manufacture of a patented cleaning compound. The company has purchased a site 124 x 425 ft. on the Pennsylvania Railroad and Dorothy street and will at once build and equip a manufacturing plant. R. J. Walters, formerly manager of the Pluto Powder Company, is president and general manager of the new company.

## New England

BOSTON, MASS., April 22, 1913.

The business situation is difficult to analyze. The feeling of uncertainty begotten of the condition of money and the stock markets and of impending tariff legislation has increased. Individually works are active and new business is fairly good. This statement includes nearly all lines of manufacturing industry, the exceptions being especially in textile lines. As a rule men who express doubt as to the future state that their own business is good. In the metal lines prosperity continues with no serious abatement. The machine tool builders and dealers are but little less prosperous than they have been. Some deferred business is reported, but no instances of cancellations are disclosed. Certain observers whose opinions are usually sound believe that existing deterrent influences are temporary. Some rather wild canards are afloat, such as reports of industries moving abroad, root and branch, to take advantage of cheaper labor there and get the benefit of the reduced tariff here. Every project to establish a subsidiary branch in another country is twisted into an industry lost for good and all.

The Boston & Maine Railroad has placed its orders for the new car and locomotive repair shops at Billerica, Mass. The list was well distributed among the dealers.

The auction sale of the business and patent rights of the Chandler Planer Company, Ayer, Mass., on Thursday of this week has unusual interest, not only because a large lot of modern machine tools will be disposed of but because the patents are unusual. The Chandler Company was organized nearly 10 years ago, and placed on the market a metal-planing machine which was a radical departure from the then accepted practice. Its essential feature is a quick return, made possible by the use of a third belt, which reduces the speed to a safe limit just as the end of the stroke is reached. In addition the designers introduced ground case-hardened shafts and an extreme of proportions as to weight. The result was a machine well suited to the use of high-speed steels, which were commencing to come into general use. The company established a well-equipped plant and sold a good many of its machines. Later a clutch-driven planing machine was developed, of extreme power, with continuous belt drive for the cut and for the return, but this machine was never marketed. In 1906-1907 the financial problems of the corporation became unmanageable, and the attempt at reorganization failed. Since then the shops have produced but few machines. Much speculation is rife as to the future ownership of these patents and their possible development.

The reorganization of the Pratt & Cady Company, Hartford, Conn., is proceeding rapidly, and the business should be placed on a substantial basis in the near future. The report of the receiver just filed shows a prosperous condition, with a substantial gain under his management. A strong reorganization committee, consisting of Francis R. Cooley, Daniel R. Howe and Frank C. Sumner, has begun its work, and more than 80 per cent. of the stock has been deposited with them. In consequence the receiver has taken no steps toward disposing of the business as a going concern.

The Underwood Typewriter Company, Hartford, Conn., will shortly locate its casting department at Wheeling, W. Va., according to a news dispatch from that city. The site mentioned is the Lathe Works in North Wheeling, near the plant of the Alloy Steel Casting Company.

The Quigley Furnace & Foundry Company, Springfield, Mass., has begun the construction of a temporary machine shop which will be 53 x 57 ft., one story. The permanent shop building will probably be erected later in the year, and will be of the same construction as the new foundry, brick and steel. The foundry has begun operations.

The Special Machinery Company, Hartford, Conn., will establish a new plant on Woodland street, near Homestead avenue. The main building will be 63 x 100 ft., three stories, with two stair towers 10 x 20 ft. and a tower 12 x 40 ft. for elevator, toilet rooms and stairs. The structure will be of reinforced concrete with concrete roof and floors. The company will occupy one floor of the building and will rent the remaining space for manufacturing.

The Bay State Stamping Company, Worcester, Mass., the factory of which was badly damaged by fire, has resumed manufacturing. While the building was seriously burned the machinery was not greatly injured, and strenuous efforts, which commenced the day of the fire, have resulted in a quick resumption of activities. The company manufactures pressed metal goods.

The new building of the Weed Chain Tire Grip Company, Bridgeport, Conn., will be 110 x 242 ft., one story, with saw tooth roof. The plans call for another building of three stories, which will be erected later.

The Wamesit Power Company, Lowell, Mass., will add a story 50 x 88 ft. to its plant.

Additions to general manufacturing facilities of New England include the following: Florence Mfg. Company, Florence, Mass., addition 37 x 145 ft., four stories and basement; Vanderhoef & Co., Norwalk, Conn., four-story factory, 32 x 106 ft., brick, mill construction; Aspinook Company, Jewett City, Conn., three-story addition, 50 x 108 ft., brick, mill construction; Shetucket Company, Norwich, Conn., large addition, plans of which are not ready; Watson Company, Attleboro, Mass., addition 60 x 185 ft., to cost \$60,000; Lionel Mfg. Company, New Haven, Conn., large additional manufacturing capacity.

The Prest-o-Lite Company, Indianapolis, Ind., will establish a plant at Springfield, Mass., consisting of a brick and concrete building 63 x 89 ft., two stories.

In correction of the paragraph which appeared in this column in *The Iron Age* of April 3, referring to the purchase of the business and plant of the Nutter & Barnes Company, Boston, and its removal to Hinsdale, N. H., it should be said that the Nutter & Barnes Company is a corporation entirely separate from the Granite State Mowing Company Company, Hinsdale, N. H., of which F. O. Wells is also president, and a separate plant has been provided for the Nutter & Barnes Company below that of the Granite State Mowing Machine Company on Main street. The new plant gives much more room than the company had at Boston and will permit of carrying on the business on a larger scale. The Nutter & Barnes Company is a Massachusetts corporation. F. O. Wells is president, F. H. Payne vice-president and W. S. Howe treasurer and general manager.

## Philadelphia

PHILADELPHIA, PA., April 22, 1913.

In the aggregate the week's business shows a general betterment, confined largely to single tool and small lot orders. Estimates are now going in against the recent tool equipment inquiries of the Pennsylvania Railroad, and while no orders have yet been placed, little delay in closing against a large part of the business is anticipated. It is understood that appropriations aggregating close to \$1,000,000 have been made for equipment purchases. While general inquiries for machine tools have been more active few large groups of tools have been coming out. Manufacturers of machinery and tools while fairly busy are able to make comparatively good deliveries, except in some classes of special machinery. Second-hand machinery moves rather slowly. In power equipment, both new and second-hand, a fair amount of business is pending. The demand, however, is mostly for medium and small powers. The foundry trade continues actively engaged. There is a good demand for machinery castings. Steel casting plants are operating at full capacity.

The North Wales Machine Company, Inc., North Wales, Pa., has broken ground for a large addition to its foundry, materially enlarging the molding floor space. The company advises that it will not be in need of any additional machinery or foundry equipment.

The Allston Saw & Steel Company is erecting a new plant at Folcroft, Pa., on the Baltimore & Ohio Railroad, which it expects to occupy soon. The company's office, now located at 925 Chestnut street, this city, will be removed May 1 to the new plant.

The Hanover Cordage Company, Hanover, Pa., will build a large addition to its plant. The contract for the erection of the building has been given to a local contractor, who will also supply materials. The company advises that it will not require any additional machinery equipment.

The Vulcan Gas Engine Works will remove about May 1 to its new plant, now under construction at 1829 to 1831 Bainbridge street. The new building will be 32 x 115 feet, one and two stories, and while the machinery now in the present plant will be installed, further purchases from time to time are contemplated.

H. Brugler, architect, Danville, Pa., is taking bids for additions to the G. F. Geisinger Memorial Hospital, in that city. A 24 x 47 ft. addition to the hospital, a 60 x 31 ft. power house and a 40 x 45 ft. laundry building will be erected and the necessary power and laundry equipment installed.

W. Hunter, architect, is now taking bids for the new repair shops to be erected by the Philadelphia & Reading Railway at St. Clair, Pa. Two buildings, of brick,

steel and concrete, will be erected, 53 x 464 ft. and 60 x 83 ft., one and two stories. Bids for the construction of the buildings go in this week.

George W. Norris, director of the Department of Wharves, Docks and Ferries, 553 Bourse Building, Philadelphia, will receive bids until April 30 for the furnishing and installing of a high grade gasoline engine.

It is currently reported that the J. L. Mott Iron Works, Trenton, N. J., has acquired property adjoining its plant which will be used as a site for a new enameling plant.

A permit has been taken by the City Baking Company, Baltimore, Md., for the erection of a large plant on Laurens street, above Carey street, in that city. The buildings will be one and two stories, on a site 154 x 251 ft. Modern baking plant equipment will be installed.

The City Transit Commissioner, A. Merritt Taylor, has practically completed plans for transit improvements which would involve an approximate expenditure of \$38,000,000. These plans include a double track subway under Broad street from Oregon to Olney avenues, from the extreme north to south end. Elevated spurs to Frankford and to Darby are proposed. Efforts are now being made to have the state Legislature pass enabling acts, which would permit the city to borrow money for this improvement.

It is stated that John H. Powers, Gaither Building, Baltimore, Md., has plans in preparation for a group of buildings to be erected for the Lord Baltimore Motor Company, Baltimore, Md. The buildings are to be of steel and concrete. Details are not yet available.

A. F. Hammond, superintendent of supplies, School District of Philadelphia, 392 City Hall, will receive bids until April 30 for cases, shelving, molding troughs and coke ovens for the West Philadelphia high school for boys, Forty-eighth and Walnut streets.

## Chicago

CHICAGO, ILL., April 22, 1913.

The first shipments of machinery from the Cincinnati district to Chicago since the tie-up of the railroads following the floods were started last week. In view of the increased number of live inquiries appearing in this market this re-establishment of factory deliveries is particularly satisfactory. The Chicago & Northwestern Railway has issued a list of tools for its new Clinton shops, the larger number of which were placed in one lot, and the Atchison, Topeka & Santa Fé is in the market for the following machines:

Two motor-driven 42-in. vertical boring and turning mills.  
One motor-driven 51-in. vertical boring and turning mill.  
One 20-in. engine lathe.  
One 24-in. milling machine for locomotive brasses.  
One 36 x 36-in. x 12-ft. planing machine.  
One 24 x 24-in. x 6 ft. planing machine.  
One 36-in. x 10-ft. engine lathe.  
One No. 5 universal milling machine.  
One belt-driven No. 19 pipe machine.  
One double-end punch and shear, capacity 1 in. in 34 in., 8, 10 or 12-in. throat.  
One 400-ton, 48-in. hydraulic wheel press.  
One 1500-lb. single-frame steam hammer.  
One 100-lb. single-frame steam hammer.

The Monighan Machine Company, 2024 Carroll avenue, Chicago, has had plans prepared for an addition 25 x 123 ft. two stories, to its machine shop, to cost \$16,000.

Joseph J. Dobes & Son, 79 South Clinton street, Chicago, have let the contracts for a new machine shop to be erected at 1907 South Western avenue and to cost \$16,000.

The Cleveland Punch & Shear Works Company and the Cleveland Crane & Engineering Works have opened offices in the Marquette Building, Chicago, in charge of H. B. Foster.

The Chandler Engine Valve Company, Chicago, has been organized with a capital stock of \$60,000 to engage in manufacturing. The incorporators are George A. Christon, E. F. Hoskin, Glencoe, Ill., and N. B. Dearborn.

L. C. Kuhnert, Jr., & Co., manufacturers of gasoline engines, 218 North Jefferson street, Chicago, has been incorporated with a capital stock of \$30,000 to manufacture farm implements and mechanical devices in addition to the present line of engines.

The Jackson Mfg. Company, Rockford, Ill., has been incorporated with a capital stock of \$25,000 by Charles E. Jackson, Roy C. Jackson and A. H. King to manufacture washing machines.

The Griffin Construction Company, Chicago, has been organized with a capital stock of \$1,500 to engage in general engineering work connected with the installation of power and heating plants.

John Scriven, Dixon, Ill., is building a blacksmith and machine shop for which he will require equipment.

The Havana Mfg. Company, Havana, Ill., builder of gasoline engines and transmission machinery, is adding to the equipment of its foundry.

The Gardner Fields Mfg. Company, Chicago, has been incorporated with \$5,000 capital stock to manufacture metal goods. The incorporators are R. H. Gardner, 568 Washington Boulevard; W. K. Fields and C. S. Fields.

The Iowa Gate Company, Cedar Falls, Iowa, has chosen a site upon which it will build a new factory.

The Universal Form Clamp Company, Chicago, has been formed with a capital stock of \$50,000 to manufacture clamps and wrenches. The incorporators are L. Lampert, W. C. Lampert, 5218 Winthrop avenue, and W. D. Johnson.

The Given Moore Company, Spring Valley, Ill., has been incorporated with a capital stock of \$100,000 to take over the business of the Given Moore Company, Columbus, Ind. The factory at that point will be operated until its new building now under construction at Spring Valley is completed. The equipment at the old plant will be used as far as possible in the new factory. The company manufactures machinery and farm implements. The officers of the new company are Given Moore, president; Charles Fehr, vice-president; Arthur C. Moore, secretary, and Peter DeFilipi, treasurer.

The National Malleable Castings Company is building an additional steel foundry building at its Melrose Park, Ill., plant. It will be used for the most part as a warehouse for raw material.

The Chicago & Northwestern Railway, whose plans for building shops at Clinton, Iowa, have been previously mentioned, is now asking bids on these shops, one to be 164 x 224 ft. and another 164 x 201 ft. In addition a store room 60 x 150 ft., an engineers' building 24 x 60 ft. and a transfer table 50 x 544 ft. will be built. Bids will be received at the Chicago office of the company.

The Peoples Gas Light & Coke Company, Chicago, is planning the construction of a mammoth gas producing plant which will cost over \$25,000,000. The initial construction, consisting of one unit of the plant, will involve an expenditure of \$6,000,000 to \$8,000,000 and will provide a capacity of 20,000,000 cu. ft. daily. A great quantity of power and conveying machinery will be required.

The Baldwin Locomotive Works has begun the excavation for foundations for its new plant to be built in the Calumet district south of Chicago. Plans are also being prepared for the erection of several hundred houses for workmen.

The city of Fontanelle, Iowa, has voted \$22,000 in bonds to provide for the building of municipal lighting plant and waterworks.

## Detroit

DETROIT, MICH., April 22, 1913.

Transactions of importance are lacking and the market is narrow and confined in the main to single tool propositions. There is a considerable amount of new inquiry now pending, which dealers hope will result in definite orders before the first of the month. There exists some uncertainty as to the effect the revision of the tariff will have on Detroit's automobile industry and while it is undoubtedly true that the expansion of factories has not been proceeding on such a large scale as formerly, this is considered to be due more to the fact that this industry is finding its level and settling down than to any fear that its prosperity is threatened by outside influences. On the other hand, the important beet sugar industry is facing a crisis and it is extremely probable that not only will no new plants be built, but that some of the existing factories will not continue operations beyond the present year. The second-hand machinery trade is reported to be a trifle more active and in some instances a really fair amount of business has been moving. Plants in the metal working trades continue well engaged.

The Detroit City Gas Company, Detroit, has begun the erection of a three-story reinforced concrete service station at Fourth and Locust streets. The building will be equipped to take care of all the repair work of the gas company.

The Thermo Electric Starter Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture engine starting systems and automobile accessories. Richard B. Hewitt, Birmingham, Mich., is the principal stockholder.

The Detroit Wire Spring Company, Detroit, has awarded the contract for a brick and mill addition to its plant at Morrow and Marston streets.

The Detroit Elevator Safety Appliance Company, Detroit, has been incorporated with \$50,000 capital stock to manufacture elevator appliances. The principal stockholders are C. K. Bishop and G. M. West.

The Eckliff Automatic Boiler Circulator Company, Detroit, has increased its capital stock from \$5000 to \$30,000.

The Morgan & Wright Company, Detroit, auto tire manufacturer, has taken out a building permit covering the erection of a three-story factory building 174 x 257 ft., of reinforced concrete construction, to be built at Jefferson and Bellevue avenues.

E. Gregory, Baltimore, Md., has acquired a factory site at Hubbard avenue and the Michigan Central Railroad and will, it is stated, erect a factory building 120 x 200 ft., four stories and of brick construction.

Among the bond issues in Michigan which were voted on favorably at the state elections April 7 were: City of Grand Rapids, pumps for the waterworks and extensions, \$100,000; city of Port Huron, waterworks, \$30,000, and sewers, \$16,000; city of Jackson, waterworks improvements, \$22,000, and sewers, \$18,000; and city of Boyne City, waterworks extensions, \$10,000.

The Ideal Concrete Block Company, Charlotte, Mich., will remove its plant from that city to Lansing, Mich., where a larger factory has been secured.

Edward Copps, Milwaukee, Wis., has purchased a large tract of marble lands in Houghton County, Mich., and is planning their development by the establishment of a large marble grinding plant to cost \$20,000.

The Geyerline-Meyers Brass Foundry Company, Kalamazoo, Mich., has been organized with a capital stock of \$20,000 to build and operate a brass foundry plant.

The capital stock of the Argo Electric Vehicle Company, Saginaw, Mich., has been increased from \$400,000 to \$500,000.

The assets of the Triumph Mfg. Company, Detroit, manufacturer of motorcycles, which has been adjudicated a bankrupt, will be sold at receiver's sale April 28. The plant and equipment are valued at \$60,000.

## Cleveland

CLEVELAND, OHIO, April 22, 1913.

Business with machinery houses has partially recovered from the dullness that was brought on by the recent Ohio floods, but the demand is not active, being confined to a limited volume of orders for single tools and small lots. Little in the way of new inquiry came out in the week. Makers of handling equipment, including locomotive cranes, hoists and trolleys, report a heavy demand for their products, the call for locomotive cranes and some of the other lines of handling equipment never having been as heavy as at present. In the foundry trade conditions generally are satisfactory, jobbing foundries being well filled with work.

Large extensions will be made to the manufacturing plant of the American Stove Company, at Bedford, Ohio, which is operated under the name of the Best Foundry Company. Plans for these extensions are being prepared by W. J. Carter, architect and engineer, Cleveland. The company will build an extension 180 x 200 ft. to its foundry building and an extension 50 x 200 ft. to its finishing department.

The International Harvester Company, which some time ago announced that it would enlarge its Akron, Ohio, plant, has awarded a contract for two buildings in that city. They will be six stories and basement and will have floor space of 250,000 sq. ft.

Swift & Co., Chicago, Ill., will erect a four-story branch plant 72 x 175 ft. in Lima, Ohio, for which electric elevators and other equipment will be required.

The Board of Trade of Coshocton, Ohio, has entered into a contract with the S. & M. Tire & Rubber Company, capitalized at \$400,000, to erect its plant in that city. The new industry will be located in a manufacturing plant at present unoccupied, which will be remodeled for that purpose. The company will make automobile, motorcycle and bicycle tires and other rubber goods. It is stated that later a department will be established for the manufacture of metal rims for automobile wheels.

The Board of Trustees of the Ohio State University, Columbus, Ohio, will receive bids May 12 for two automatic underfeed stokers.

The Peerless Bread Machine Company, Sidney, Ohio, has disposed of its foundry equipment and business to Philip Smith Mfg. Company in that city. The

Smith company is contemplating improvement to its plant.

The Brown Clutch Company, Sandusky, Ohio, has taken over the foundry business of the Sandusky Machinery Castings Company, Sandusky.

The Williams Supply Company, Sunbury, Ohio, will enlarge its machine shop by the erection of a building 60 x 100 ft.

The Modern Lock Nut Mfg. Company, Warren, Ohio, has been incorporated with a capital stock of \$25,000 by F. M. Strecker, N. H. Gray, George Bunting and others.

The Canton Engineering & Electric Company, Canton, Ohio, has placed contracts for a new three-story building.

The Hoenig Machine Company, East Liverpool, Ohio, has been incorporated with a capital stock of \$10,000 by Harry E. Hoenig, John H. Edwin, C. Deane and others.

The Galion Brass & Bronze Company, Galion, Ohio, has nearly completed its new plant and expects to have it in operation May 1.

The Buckeye Foundry Company, Upper Sandusky, Ohio, will build an addition to its plant.

The village of Paulding, Ohio, will receive bids April 29 for the sale of the old equipment of its municipal light and water plant, including boilers, engines and generators, this sale to be contingent upon the installation of new equipment which will be purchased.

## Cincinnati

CINCINNATI, OHIO, April 22, 1913.

Reconstruction work in the district that was flooded last month is going on at a rapid rate. It has also brought out an almost unprecedented demand for common labor. It is worthy of note that neither skilled nor common laborers have made any demands for extra compensation, although there are many instances where employers paid their skilled men their regular wages when engaged in the work of cleaning up. With very few exceptions, all manufacturing plants in this territory will be in full operation before the end of the present month.

Contrary to the expectations of many machine tool builders in Cincinnati, orders received last week probably show a better general average than for two months past. Considerable of this business is from the export trade.

Second-hand machinery dealers report business as being rather slow, and there is also a let-up in the demand for electrical equipment.

The Factory Power Company, Oakley, a Cincinnati suburb, will soon call for bids on a proposed addition to its plant that will be 80 x 95 ft., one story, and of brick construction. The company furnishes power and heat for the different machine tool plants in Oakley, and as previously reported, several extensions will be made to different factories some time in the summer.

An automobile garage and small repair shop will be erected by A. T. Weiss at 112-114 West Court street, Cincinnati.

The Tool Steel Gear & Pinion Company, Carthage, Ohio, a Cincinnati suburb, has awarded contract for the proposed addition to its plant, mentioned some time ago. The plans were prepared by Architects B. L. Baldwin & Co. Machinery requirements are not yet known.

The Cincinnati Mfg. Company intends erecting a four-story concrete factory building at Gest street and Freeman avenue. The company manufactures fly screens and other metal specialties, and will need additional machinery equipment.

It is stated that the Cincinnati Pulley Machinery Company, Covington, Ky., is having plans prepared for rebuilding its plant destroyed by fire several weeks ago. It is now occupying temporary quarters on Madison avenue.

The Cambridge Furniture Mfg. Company, Cambridge, Ohio, has been incorporated with \$50,000 capital stock, to manufacture furniture and household specialties. T. W. Scott is one of the principal incorporators.

The Orr Felt & Blanket Company, Piqua, Ohio, sustained a loss by fire last week, estimated at \$20,000, partially covered by insurance. The company announces that it will rebuild at once.

The Phillips Smith Mfg. Company, Sidney, Ohio, has purchased the foundry of the Peerless Bread Machine Company, which action will enable it to increase its present output more than 50 per cent.

The Crescent Machine & Tool Company, Cincinnati,

now located on Second street, has had plans prepared for a new plant to be erected on Reading road, near Elsmore roadway. The proposed building will be 25 x 50 ft., one story and of regular mill construction.

The Champion Coated Paper Company, Hamilton, Ohio, whose plant was destroyed by fire in the recent floods, has settled its insurance loss and will begin immediately the construction of a new factory. Considerable special machinery will be required.

The Niles Tool Works Company, Hamilton, Ohio, was able to start its plant April 21. Part of the machine shop was put into operation one week after the flood subsided.

The D. L. Casey Machine Company, Springfield, Ohio, is in the market for two twin Corliss engines to develop 1600 hp. Second-hand equipment in good condition is preferred.

### Wheeling

WHEELING, W. VA., April 22, 1913.

The Sutton Pulp & Paper Company, Sutton, W. Va., has been chartered, with \$1,000,000 capital stock, to manufacture pulp and paper. The incorporators are W. F. Morrison, Alfred Walker, William H. Lee, E. G. Rider and C. H. Bland, all of Sutton.

A charter was issued to the Glass Lined Can Company, of Chicago, with an authorized capital stock of \$150,000, to manufacture glass lined milk cans. The incorporators are Edward, Adolph and Paul Holman, Julius A. Scheyer and Leonard R. Steel, all of Chicago, Ill.

The Big Ugly Creek Mining Company, Huntington, W. Va., was chartered, with a capital stock of \$60,000, to mine coal and manufacture lamp black in Lincoln County, W. Va. The incorporators are A. J. Stein, Vanceburg, Ky.; G. Neace, George J. McComas, H. E. Love and Daniel Dawson, all of Huntington.

The Monongalia Electric Company, Morgantown, W. Va., has been incorporated, with a capital stock of \$5,000, to supply light and power and build railroads. The incorporators are William S. John, Glenn Hunter, F. Sutton Boyd, Walter H. South, Frank L. Bowman, all of Morgantown.

The Standard Mattress Company, Huntington, W. Va., was organized with \$50,000 capital stock. Ground has been broken for a \$12,000 factory. S. W. Croft is president; Claude Walker, vice-president; J. T. Masterson, treasurer.

The Lewis Lumber Company, Albright, Preston County, was incorporated, with \$25,000 capital stock. The incorporators are R. K. Morton, B. M. Stuntz, A. S. Alexander, F. R. Hurlbutt, B. J. Graham, all of Charleston, W. Va.

The West Penn Traction Company has had plans drawn by W. E. Moore, engineer, Pittsburgh, for a \$25,000 addition to its power plant at Wheeling. The building will be of masonry, concrete and brick, 63 x 100 ft.

### Indianapolis

INDIANAPOLIS, IND., April 22, 1913.

The Independent Envelope Company, Indianapolis, has acquired a 9-acre tract at Washington street and Sherman Drive and is having plans prepared for buildings to cost \$100,000. The main building, of brick, will have 90,000 sq. ft. of floor space. Frank McAllister is president of the company; O. D. Haskett, vice-president; Walton L. Dynes, secretary-treasurer and general manager.

The Wizard Motor Company, Indianapolis, has increased its capital stock from \$50,000 to \$100,000.

The Inland Electric Company, Indianapolis, has changed its name to the Drew Electric & Mfg. Company.

The Jenney Electric Starter Company, Indianapolis, has changed its name to the Jenney Electric Corporation.

The Hampe Mfg. Company, Indianapolis, has been incorporated, with \$20,000 capital stock, to manufacture gasoline gauges, etc. The directors are William, L. B. and T. M. Hampe.

The Tri-State Package Company, Indianapolis, has been incorporated, with \$30,000 capital stock, to manufacture machinery and paper box products. The directors are O. C. Pierson, Albert D. Brewer, C. H. Howland, K. K. Clendenning and H. L. Huddleson.

The Muncie Gas Engine & Supply Company, Muncie, Ind., has changed its name to the Muncie Oil Engine Company.

The Linton Gas Company, Hammond, Ind., has increased its capital stock from \$100,000 to \$200,000.

The South Bend Dowel Works, South Bend, Ind.,

has been incorporated, with \$50,000 capital stock, to do a general woodworking business. The directors are J. E. Kuntz, T. E. Kuntz and R. M. Kuntz.

The Insurance Machine Sales Company, Anderson, Ind., has been incorporated, with \$10,000 capital stock, to manufacture insurance vending machines. The directors are A. H. Jones, E. M. Oswald, F. H. Brock, F. L. Baker and R. H. Brandon.

The Wayne Oil Tank & Pump Company, Fort Wayne, Ind., has increased its capital stock from \$250,000 to \$300,000.

The George W. Davis Carriage Company, Richmond, Ind., has changed its name to the George W. Davis Motor Car Company.

The Indiana Car & Equipment Company, Calumet, Ind., has been incorporated, with \$12,000 capital stock, to deal in railway equipment. The directors are L. J. Smith, P. H. Joyce and T. C. McCailla.

The American Highway Supply Company, Terre Haute, Ind., has been incorporated, to deal in bridges and road machinery. The directors are W. A. Braden, A. D. Huff and J. A. Shepherd.

The Roanoke Water Company, Roanoke, Ind., has been incorporated, with \$15,000 capital stock, to furnish water. The directors are N. D. E. Richards, N. L. Highlands and D. A. Wasmuth.

### The Central South

LOUISVILLE, KY., April 22, 1913.

The machinery business remains rather quiet. This sluggish condition of trade is somewhat hard to account for. Now that seasonable weather has come and the effect of the floods of several weeks ago have begun to wear off, business should be improving. Most manufacturers and dealers report that not a great deal of new trade is coming to the front, and that neither orders nor inquiries are over-plentiful. While few have suggested the tariff situation at Washington as a reason for the pronounced lull, this explanation may be worth something. Meanwhile everybody is hoping that a return to normal will be recorded in the near future.

George Holzbog, Jeffersonville, Ind., who has been working on a proposition to put the old plant of the Louisville Bolt & Iron Works in operation, is reported to have made arrangements for the organization of a new company to be known as the Louisville Steel & Iron Company, to take over and operate the property. Pittsburgh interests are said to be financing the enterprise. C. A. Swan, of Pittsburgh, is to be in charge of operations if the deal goes through.

Grainger & Co., Louisville, have the contract for the manufacture of the special machinery to be used in the plant of the Mindease Company, which has been organized to manufacture a substitute for air for use in automobile tires. W. C. Brohm, vice-president of Grainger & Co., is general manager of the new concern.

E. D. Morton & Co., local machinery dealers, have sold a 26-in. back-gear drill to the Louisville Cement Company. The machine is the product of the Aurora Tool Works, Aurora, Ind.

John Kleinstuber, a Louisville florist, is planning the installation of an additional boiler in his heating plant.

The H. E. Heimberger Veneer & Lumber Company, New Albany, Ind., is being formed for the purpose of enlarging the business of the Heimberger & Drinkard Veneer Mills, which it is to succeed. A bandmill is to be installed by the new company.

The Butler County Coal Company, Morganstown, Ky., will proceed with the purchase of machinery for a large coal mine which it will establish at Aberdeen, Ky., G. L. Drury is vice-president of the concern, which owns 800 acres of coal land.

The Southern Sheet & Tin Plate Company, Ashland, Ky., will contract for the construction of a mill building about May 1. The company is incorporated with \$50,000 capital stock. J. W. Job is president.

The Fiscal Court at Bowling Green, Ky., is in the market for a stone crusher with a capacity of 10 tons an hour. M. H. Crump is road engineer.

The grain elevator of Gano & Smith, Georgetown, Ky., was burned recently with \$30,000 loss. The concern plans the reconstruction of the plant, which will require power and special machinery.

Corbin, Ky., has begun to let contracts in connection with the establishment of a water system. The site for the pumping station has been purchased, and the equipment for this will be purchased shortly.

L. G. Strode, Lexington, Ky., is to erect an eight-story office building there. The equipment will include two elevators and a steam heating plant.

The spoke and rim factory of E. E. Doles at Greens-

burg, Ind., was destroyed by fire April 15 with \$10,000 loss. The owners are considering rebuilding plans.

The Goodwyn Coal & Ice Company, Bristol, Tenn., will erect an addition to its ice factory. It will produce 50 tons of ice daily with the new machinery installed.

The Interstate Ice & Coal Company, Augusta, Ga., has purchased an ice factory at Lebanon, Tenn., and will enlarge. New machinery will be purchased at a cost of \$4,000.

A water power plant will be built on Big Creek by the Rogersville Hydroelectric Power Company, Rogers, Tenn., which has been incorporated with \$5,000 capital stock. J. E. Miller, George D. Hale and others are interested.

The spoke and handle factory of N. C. Blanchard, Spring City, Tenn., was burned recently with \$8,000 loss. It will probably be rebuilt.

The West Tennessee Construction Company, Memphis, Tenn., is in the market for two return tub-boilers, 60 in. x 16 ft. They are wanted for a waterworks plant.

C. T. McGee, West Point, Tenn., is planning the enlargement of his lumber plant, planing-mill equipment to be installed. He now operates a sawmill for the manufacture of rough lumber.

J. R. Stewart, Biloxi, Miss., is considering the establishment of a tannery. Power equipment, conveyors and other machinery will be needed.

Georgetown, Miss., has voted to issue \$7,500 of bonds for the purpose of installing waterworks.

B. F. Harwood, Uniontown, Ala., will be in the market for a gasoline engine for the operation of a feed mill, as well as the grinding machines and other special equipment needed for the mill.

E. W. Baker, Huntsville, Ala., has decided on the reconstruction of his planing-mill, which was recently burned. New equipment costing \$5,000 will be purchased.

Additional machinery costing \$8,000 will be installed in the electric light plant of Quitman, Ga. The mayor may be addressed for additional information.

Richton, Miss., will probably build a water system. The mayor has preliminary plans in hand.

Lane & Bowler, Jackson, Miss., have the contract for the construction of a water system at Georgetown, Miss.

C. A. Smith, Progressive League, Rayville, La., has plans for the construction of a waterworks system and electric light plant in Rayville, which has become an important lumber manufacturing town.

The Bellgrade Lumber Company, Memphis, Tenn., is to locate a large sawmill at Isola, Miss. T. M. Cathey, president of the company, is in charge of the purchase of machinery for the plant, which will be equipped with an eight-foot bandmill with 12-in. saws.

## Milwaukee

MILWAUKEE, Wis., April 21, 1913.

Labor conditions in the Milwaukee district are not so settled as might be desired, and as the summer approaches employers are beginning to realize that they will have a harder time than ever to get sufficient competent help. Even the cheapest class of labor is scarce. Foundries are especially affected by the shortage, and employers are paying from 18½c an hour up, which is 2c more than at this time a year ago. Four or five architectural iron and wire works are tied up by strikes due to the organization of a new union covering this class of shops. Ironworkers on structural jobs are giving considerable trouble. Outside of the labor difficulties, shops are making great headway in closing up the gap between orders and deliveries. No large orders are reported in any quarter, but there is enough on hand to keep shops busy to the limit and the works operating nights have received some additions in the last 10 days.

The assets and property of the Harris Typewriter Company, Fond du Lac, Wis., consisting of real estate and building, in one schedule, and tools, equipment and patterns, in another schedule, will be sold at public auction May 15. The company was organized and engaged in the manufacture of typewriters about two years ago, but early this year creditors stepped in. G. A. Knapp, E. J. Perry and D. D. Sutherland are the trustees for the bondholders. It is likely that the purchasers will use the property for other manufacturing purposes than the production of typewriters.

The Philadelphia & Reading Coal & Iron Company, which maintains large docks and distributing station at Milwaukee, will spend about \$500,000 in increasing its capacity and improvements and repairs to its con-

veyors this year. Two conveyor units were badly damaged by a windstorm late in March. It is the intention to change the drive from steam to electricity throughout. The Milwaukee interests are in charge of E. T. McDonald, 703 Majestic Building.

The Milwaukee-Western Fuel Company, operating seven large docks situated on the various rivers and canals in Milwaukee, is making plans for improvements and enlargements which will entail an expenditure of \$350,000 or more. Much of this will be spent for structures and machinery, all of the old style conveyors and hoists to be replaced by electrically-operated equipment of the latest type. E. A. Uhrig, 14 Grand avenue, is president.

R. A. Cook, president and general manager of the Central City Iron Works, Stevens Point, Wis., is changing the entire factory drive from steam to electric. The contract for the work, including three large motors, is being executed by the Natwick Electric Company, Stevens Point.

The Wausau Brewing Company, Wausau, Wis., recently organized with a capital stock of \$150,000, has completed plans and specifications for a brewing and malting plant to cost \$100,000, and bids for the various divisions of the construction and equipment work will be received until May 5 by John King, secretary. A complete power equipment, including boilers, is required. A small list of tools for the machine and repair shop will be purchased later.

The Common Council of Appleton, Wis., has awarded the general contract for the construction and equipment of a new filtration plant and pumping station for the municipal waterworks system to the Jewell Water Improvement Company, Chicago. The cost will be \$225,000, including \$54,000 for pumps and engines; distribution system, \$90,000; feed pipe, \$2,500, and filtration equipment, \$47,000.

The C. Reiss Coal Company, Sheboygan, Wis., will this season complete the new coal dock at Green Bay, Wis., the contract for which is in charge of the Wisconsin Dredge & Dock Company. The dock proper will be 400 x 550 ft., with a capacity of 250,000 tons. A complete new equipment of conveyors, hoists, buckets, cable and electrical power equipment will be required.

The Wisconsin Aluminum Foundry Company, Manitowoc, Wis., has commissioned Earl F. Miller, architect, Manitowoc, to prepare plans and specifications for its new foundry plant, to be erected on the Smalley tract at Sixteenth and Franklin streets. It will consist of three buildings, a foundry 50 x 100 ft., finishing room 50 x 100 ft. and an administration building 40 x 50 ft. The two factory buildings will be of steel and brick construction and contain a complete new equipment of ovens, machinery, power units, etc. Construction work will begin about May 15.

As a step in preparing for the construction and equipment of its proposed new plant, the Feilbach Motor Company, Milwaukee, manufacturing motorcycles, has increased its capital stock from \$20,000 to \$50,000. The site of the new works will be at the northern city limits of Milwaukee, on Keefe avenue.

## St. Louis

ST. LOUIS, Mo., April 21, 1913.

The machine tool market continues to develop satisfactorily, and so far as can be determined the tariff talk is having no depressive effect on the industries in this territory which have machine tool needs. The market is in receipt of no list for new tools of large proportions, but the aggregate of the individual orders is pleasing to the dealers. Second-hand tools are in fair demand. Collections are reported satisfactory.

The Otis Elevator Company, of Missouri, has completed plans and taken out a permit for the construction and equipment of a two-story building to be devoted to repair shop and warehouse purposes.

The Central Illinois Utilities Company, a subsidiary of the Commonwealth Electric Company, of Chicago, which has acquired a number of public service enterprises and which is reported as having plans for a monster coke plant, probably at Marion, Ill., in the heart of the coal-producing district, and will pipe gas to many surrounding towns.

The Studebaker Corporation of America will build an assembling and repair shop in St. Louis, the structure to cost exclusive of equipment about \$75,000.

A seven-story building 63 x 125 ft. is to be built in St. Louis and equipped exclusively for printing plants by John B. Krieger. The total investment will be about \$250,000.

The Luyties Pharmacy Company, St. Louis, has let

a contract for a building to cost, exclusive of equipment, about \$30,000, to be used as a drug and chemical manufacturing plant. Power, heating and electric plants will be installed.

The Hueston-Bland Stone Company, Hannibal, Mo., has been incorporated by Matthew E. Hueston, William R. Bland and Wilbur E. Chamberlain, with \$10,000 capital stock to equip and operate a stone manufacturing plant.

Bids were opened in St. Louis last week for about \$1,200,000 of improvements to the waterworks system, including a new intake tower and equipment which will increase the possible capacity of the plant to 200,000,000 gal per day. The awards have not yet been made.

The Eureka Coal Mining & Mercantile Company, Rich Hill, Mo., with \$20,000 capital stock, has been incorporated by F. A. Griffen, J. H. Williams and John S. and George H. Davis to equip and operate coal property controlled by them.

The Reliable Incubator & Brooder Company, Quincy, Ill., with \$50,000 capital stock, has been incorporated by John W. Myers, Frank E. Rupp and Edward V. Skinker to manufacture poultry incubators and brooders.

The B. B. Constant Mfg. Company, Bloomington, Ill., with \$10,000 capital stock, has been incorporated for general manufacturing purposes by Iona G. Constant, Daniel G. Eickenberry and Henry B. King.

The Heywood Boiler Filter Company, St. Louis, with \$18,000 capital stock, has been incorporated by James McKeown, William T. Taylor and Harry B. Heywood to equip a plant for the manufacture of boiler compounds.

M. F. Suggett, Jack Shadwick and others have incorporated with \$30,000 capital stock a company to rebuild and re-equip the planing mill recently burned at Montgomery City, Mo.

The Missouri Boiler Cleaning Company, St. Louis, with \$10,000 capital stock, has been incorporated by L. W. Mead, H. I. Stevens, George G. Jokerst and others to equip a plant for the manufacture of boiler compounds.

The Stuttgart Novelty Mfg. Company, Stuttgart, Ark., with \$10,000 capital stock, has been incorporated by W. A. Edwards, N. Bynum, Henry Bryant and others to equip a general manufacturing plant.

The Safety-Burner Company, Caboo, Mo., will equip a plant for adding patented safety devices to burners, the latter being bought already manufactured.

The Liquid Tire Tonic Company, Kansas City, Mo., recently reported as the Liquid Tire Company, with \$125,000 capital stock, will equip a plant for the manufacture of a liquid to stop tire leaks. C. W. Prewett is president and G. T. Schofield manager.

The Forest Products Company, Slidell, La., is reported to be in the market for gas producers and gas engines in connection with its plans for enlarging its plant.

The Eagle Mfg. Company, Anadarko, Okla., has been incorporated with \$32,000 capital stock and will equip a plant for the manufacture of patented clothesline reels. N. D. Hamilton and others are the incorporators.

The Oklahoma Spring & Bed Mfg. Company, Oklahoma City, Okla., will double the capacity of its plant for the manufacture of bed springs, etc., and will equip with machinery as soon as an additional building is completed.

The St. Louis & San Francisco Railroad Company has plans for a 22-stall roundhouse at Tulsa, Okla., to have also considerable repair equipment.

The Bald Hill Oil Company, Muskogee, Okla., with \$100,000 capital stock, has been incorporated by W. A. Jarvis, of Muskogee, Okla.; W. A. Stinson, of Sapulpa, Okla., and W. P. Hatcen, of Wichita Falls, Texas, to develop oil properties controlled by them.

The Carpathia Oil Company, Oklahoma City, Okla., has been incorporated with \$48,000 capital stock by George E. Black, O. S. Kelly and C. K. Kiskaddon, the last of Tulsa, Okla., to equip oil properties which they have acquired.

J. D. Kottrell, W. R. Crusoe and L. H. Keller have incorporated the Springfield Oil Company at Oklahoma City, Okla., with \$50,000 capital stock and will develop property which they own.

The Southwestern Refining Company, of which J. S. Corden is president, is preparing to build a refinery with a capacity of 5000 barrels daily at Tulsa, Okla., to cost \$200,000.

A power house for the Oklahoma Public Service & Interurban Company is to be constructed at Stillwater, Okla. Complete plans are not yet announced.

A fertilizer factory representing an investment of

about \$500,000 is to be built and equipped at Shreveport, La., by a syndicate represented by Robert R. Emery.

The Guthrie Iron Works, Guthrie, Okla., with \$75,000 capital stock, has been incorporated by William F. Hoag and O. F. and Charles H. Martindale and will equip a plant at once, it is stated.

The Richardson Oil Company, with \$40,000 capital, has been incorporated at Vinton, La.

The Weil Packing Company, Little Rock, Ark., is having plans prepared for a cold storage warehouse which will require considerable mechanical equipment.

The American Veneer & Specialty Works, Newport, Ark., will add considerable new equipment, including dry kilns, vats, etc. Considerable new machinery will be bought.

## Birmingham

BIRMINGHAM, Ala., April 21, 1913.

April business in the machine and machine-tool trade has not been as heavy as in the preceding months of this year, but is far ahead of April, 1912, and is, therefore, termed satisfactory. The first quarter of the year was a banner one and, while inquiry for some products has fallen off owing to the season, the general demand for boilers and engines, for sawmills and factories as well as supplies for all manner of contractors is continuously good. There has been nothing to complain about this year.

Contracts have been signed for \$175,000 worth of equipment for the hydroelectric plant of the Alabama Power Company, Birmingham, at Lock 12 on the Coosa River, the business being divided among Allis-Chalmers Company, General Electric Company, Schenectady, Westinghouse, Electric & Mfg. Company, Pittsburgh, and Penn Steel Company. The company is spending \$500,000 a month and expects to have the steam plant at Gadsden complete by June and the hydroelectric complete by January 1.

The Ashville Cooperage Company's \$25,000 saw and planing mill plant at Ashville, Ala., was burned recently. It is understood that the plant will be rebuilt.

Crystal Ice Company, Tampa, Fla., has been incorporated with a capital stock of \$100,000 by T. J. Scully, J. A. Savarese and K. I. McKay, all of Tampa, and John R. Collins, Fossett, Canada, to establish an ice manufacturing plant.

The city of Abbeville, Ga., has voted a \$20,000 bond issue for establishing an electric-lighting plant.

The Burnwell Coal Mining Company, Birmingham, has been incorporated with a capital stock of \$50,000 by Priestley Toulmin, president; H. E. Flatwood and others. It will open coal mines.

Crutchfield & Woolfolk, Pittsburgh, Pa., will establish a packing house to handle fruits, etc., at Plant City, Fla.

The Central of Georgia Power Company, Macon, Ga., will increase the capacity of its hydroelectric plant on the Ocmulgee River near Jackson, Ga., from 16,000 to 24,000 hp. Two generators will be installed.

The Silent Salesman Company, Columbus, Ga., has been incorporated with a capital stock of \$200,000, by Samuel T. Whitaker, E. B. Reed, F. G. Power, R. P. Spencer, C. G. Peters and others. It will manufacture an automatic sending device.

J. B. Carrington, former vice-president Woodstock Iron & Steel Corporation, and S. F. Morris, of the Union Foundry Company, both of Anniston, Ala., announce that they will establish at that place a foundry for the manufacture of fibrous iron, the investment to be about \$150,000.

The Sheffield Shingle Mill, Cedar Springs, Ga., will add a small sawmill.

W. E. Burnett, Spartanburg, S. C.; W. C. Cleveland, Greenville, S. C., and A. A. Vaughan, Milledgeville, Ga., have purchased acreage at Bennettsville, S. C., and will establish a brick manufacturing plant. They will invest \$100,000 in machinery.

The Colbert County Oil & Fertilizer Company, Tuscaloosa, Ala., has been incorporated with a capital stock of \$50,000. Will build a three-press oil mill and fertilizer mixing plant.

The Consolidated Phosphate Company, Bartow, Fla., has been incorporated with a capital stock of \$1,500,000 for developing phosphate beds. C. A. Boswell is president; S. G. Wilson, secretary and treasurer; H. W. Wear, general manager.

The city of Albany, Ga., has voted \$10,000 for extension of its water mains.

The Alabama Portland Cement Company's plant at Leeds, Ala., is being enlarged and will be operated with electric current furnished by hydroelectric plant

of Alabama Power Company on Coosa River now building.

The Lovick Brick Company, Leeds, Ala., will install an electric apparatus for utilizing hydroelectric current furnished by Alabama Power Company. Alabama Consolidated Coal & Iron Company, Birmingham, is also preparing to use same current.

## Texas

AUSTIN, TEXAS, April 19, 1913.

Unfavorable crop conditions due to dry, cool weather are having a depressing effect on the machinery and tool trade in Texas. The installation of new cotton gins is being deferred on account of the unfavorable opening of the growing season. Rain is badly needed. In the irrigation districts, however, crop prospects are very satisfactory. The demand for pumping machinery continues active. Considerable is being done also in the erection of new manufacturing plants of various kinds in different sections.

Armour & Co., of Chicago, will erect a cold storage plant at Brownwood.

The Eastern Texas Traction Company, Dallas, will construct extensive terminals for its interurban electric railway at Greenville.

C. R. Davis and associates will erect a plant at Gilmer, for manufacturing boxes and crates. Frederick Dunberger is manager.

The Malakoff Lignite Company, Dallas, has been organized for the purpose of engaging in coal mining operations. The incorporators are H. C. Jones, H. J. Maersch and Joseph Samuels.

The Jefferson Cotton Oil & Fertilizer Company will erect a plant at Jefferson for manufacturing cotton-seed oil fertilizers and other cotton-seed products. John W. Taylor is general manager.

T. C. Black and associates will erect a plant at Goliad for manufacturing wooden paving blocks and building material.

The Chamber of Commerce is promoting the establishment of a plant at Beaumont to manufacture oil, butter and other products of the peanut.

J. A. Bachmann, of Austin, is constructing a large system of irrigation on the Blanco River near San Marcos. He will install a complete pumping plant.

The Cameron Water Power & Light Company will erect a pumping station and make other improvements to its waterworks system at Cameron.

T. J. Dumble will erect a plant at Fort Davis for canning fruits and vegetables.

The Cotulla Reservoir & Irrigation Company will construct dams for the purpose of creating water storage reservoirs and building a complete system of irrigation in the valley of the Nueces River near Cotulla at a cost of about \$1,500,000. It is planned to irrigate 60,000 acres of land.

The Las Cruces Electric Light & Ice Company will install a 15-ton ice machine at Las Cruces, N. M.

The Sunflower Cinnabar Development Company will erect a 20-ton furnace at its silver mines in the Mazatzal mountains northeast of Phoenix, N. M.

C. E. Cook, of El Paso, has been granted a franchise by the City Council of Columbus, N. M., for constructing a waterworks system and installing an electric light and power plant at the latter place.

The West Texas Electric Company will install additional machinery and equipment in its electric light and power plant at Big Springs.

The Miami Copper Company is remodeling its ore crushing plant at Miami, Ariz. The specifications call for the additional equipment of two sets of rollers, two screens and two elevators.

The Standard Oil Company of New Jersey has purchased a tract of land fronting on the harbor near Tampico, Mexico, on which it will erect a large oil refinery and many steel storage tanks. It is stated that the plans for these improvements call for the expenditure of nearly \$5,000,000. It will be the largest oil refinery in Mexico. The output of the plant will go chiefly to supplying the foreign trade.

The Planters Fertilizer & Chemical Company, North Fort Worth, has been organized with a capital stock of \$450,000 for the purpose of erecting a large plant for the manufacture of fertilizers and chemicals. The incorporators are Frederick W. Croll, De Witt Brown and others.

The Bishop Ice & Cotton Company will erect an ice plant and cotton gin at Bishop.

The Mount Graham Lumber Company will erect a sawmill of 40,000 ft. daily capacity near Safford, Ariz.

## The Pacific Coast

SAN FRANCISCO, CAL., April 15, 1913.

The machine tool business is rather quiet at present, sales being hardly as large as at the beginning of the month. Occasional small railroad orders are still coming out, and some garage business has been placed, with more in prospect, both here and in the country, but aside from this there is little inquiry. A feeling of great uncertainty prevails among manufacturing interests in California, as local industries are likely to be affected by tariff changes and still more by bills now pending in the Legislature. Buyers of machine tools and many special lines of machinery are accordingly waiting until the conditions under which they will have to operate in the future will be better known.

The demand for some lines of machinery, however, is keeping up regardless of political developments. It is reported that some contemplated development work has been temporarily delayed, but new contracts for railroad construction, irrigation work, hydroelectric development and the like are still coming out, and all classes of equipment are in steady demand. A contract has just been let for a street tunnel job in this city, and several similar contracts are expected within the year. Orders for woodworking equipment have been below expectations, especially in this immediate vicinity, but a good deal of scattering business is coming out as mills resume work. Logging machinery is in very fair demand, as operations in the mountain camps are being resumed. Pumping machinery is moving well, and if many pending bond issues are carried there will be considerable activity in municipal waterworks and other public improvements.

The largest order for local garage equipment recently placed was taken by C. W. Marwedel. The Marysville Garage, Marysville, Cal., a new concern, has placed its machine tool order with Harron, Rickard & McCone.

The Southern Pacific Railroad has ordered for its Los Angeles shop a 1½-in. Acme stay-bolt cutter, a double-end carwheel press, and a No. 2 Cincinnati universal cutter grinder.

The San Francisco Iron & Metal Company is awaiting the delivery of a rail-straightening machine recently ordered. This company is getting in 1500 tons of bent rails from Mexico, which will be straightened for re-laying.

The Alexander Pipe Company, handling second-hand pipe, expects to remove its shop to the vicinity of the San Francisco Iron & Metal Company on North Point street.

The Aurora Engine Company, Stockton, Cal., has been taken over by the Holt Mfg. Company.

An effort is being made to replace steam donkey engines by electric hoists for handling cargo on the local waterfront. Capt. A. Woodside has asked permission to wire pier 42 for this purpose.

The local trade has taken a fair amount of machinery business in Alaska this spring, though the dredge orders were rather late in coming out. The Union Construction Company has a number of dredge orders for Alaska. H. L. Thane, manager of the Alaska Gold Mines Company, Juneau, has been looking at mining machinery in this city lately, and will probably place some large orders.

The local office of the Orenstein-Arthur Koppel Company has taken a contract for a lot of rock cars for the Crescent City, Cal., railroad, which is building a new line; also a large order for general Koppel equipment for the Vancouver, B. C., Portland Cement Company, which is enlarging its plant from 2000 to 4000 lbs. daily capacity. The San Francisco warehouse of the Orenstein-Arthur Koppel Company is being enlarged, with the intention of carrying a considerable stock of steel cars up to 20-yd. capacity.

Plans are under way for important improvements and additions to the Crockett, Cal., sugar refinery of the California-Hawaiian Sugar Refining Company.

The Associated Oil Company has let contracts for buildings to house the machine shop, pumping and boiler equipment of its new refinery and storage station at Martinez, Cal.

The Hatfield Machinery Company, Los Angeles, has been incorporated, with a capital stock of \$20,000, by F. A. Hatfield, C. S. Miller and G. Robertson.

The Aubrey Mfg. Company is preparing to install a vacuum cleaner factory at Napa, Cal.

The contract for a waterworks pumping outfit for the town of Fullerton, Cal., has been awarded to Henry R. Worthington at \$10,250.

The Standard Lumber Company is putting in a machine shop in connection with its new mill at Standard City, near Sonora, Cal.

The Empire Water Company is preparing to install a large hydroelectric plant in the San Bernardino mountains near San Bernardino, Cal.

## Eastern Canada

TORONTO, ONT., April 19, 1913.

The Steel Equipment Company has been incorporated by E. A. Dunlop, J. W. Smith, Thomas H. Moffat, J. F. Munro, G. V. White, A. E. Cockburn and F. W. Cockburn, of Pembroke, Ont., and George J. Bryson, George B. Campbell, of Pontiac, and D. P. Cruikshank, of Ottawa. The company will continue the manufacture of steel and metal office equipment in the Eclipse factory at Ottawa until the Pembroke, Ont., factory is ready for operation in December.

Grand Gypsum, Ltd., has been incorporated with a capital stock of \$250,000. The provisional directors are J. Orr Canaghan, John G. Gauld, K. C., J. P. Steedman, Walter Anderson and Thomas W. Lester. The company will work a gypsum mine near Caledonia, Ont.

The Tivani Electric Company, Belleville, Ont., is making final preparations for beginning work early in May for the manufacture of steel directly from iron ore. The works will handle at the start two and a half tons of ore daily.

A large staff of men are engaged at the new foundries of Marsh & Henthorn, of Belleville, Ont. Most of the buildings are completed, while the machine and boiler shops are in operation. Installation of a great deal of new machinery is taking place. The old plant on Miller street has not yet been closed down.

Tenders will be received until April 24 by John Wall, general manager of the British Canadian Canners, Ltd., Lister Block, Hamilton, Ont., for the several works required in the erection of cannery factories, warehouse, etc., at Port Dalhousie, Ont., and Blenheim, Ont.

Pilkington Bros., Ltd., has purchased 173 acres at Thorold, Ont., all of which is to be used for its plant.

The Sydney Foundry & Machine Company, Sydney, C. B., has secured from the Dominion Coal Company the contract for the construction and erection complete of the new steel bankhead, the screening plant and stone trestle at Dominion No. 16 colliery.

The Ontario Gazette announced the incorporation of Crystals, Ltd., with head office at Paris, Ont. The company has a capital stock of \$100,000 and the provisional directors are John Penman, W. D. Long, James W. Blain, George Kolsky and William Hamilton Blain. The company will manufacture chemicals.

The Shawinigan Water & Power Company, Montreal, proposes to do considerable work this year in extending the plant at Shawinigan. The No. 2 power house, which was completed in 1911, will be extended to provide for two additional 20,000-hp. units.

Graves, Bigwood & Co., Toronto, have decided to erect a mill at Byng Inlet, Ont., to take the place of the one destroyed by fire last year. The foundations for the new mill are already in, and the contracts for the erection will be let immediately. The plant will have a capacity of about 175,000 ft. per day and will be equipped with modern machinery and labor-saving devices.

McBride & Gilbert, architects, were awarded the contract of preparing the plans for the new Jones lithographing factory, which is to be built in East London, Ont. The factory is to be one story and basement and will be 160 ft. long.

Colonel Carson, president, the Crown Reserve Mining Company, Cobalt, announces that the McEnaney mill will be enlarged from 5 to 20 stamps and that the full 20 stamps will probably be in operation before the summer is over.

The National Drug & Chemical Company, Ltd., of Canada, Toronto, has let contract for the erection of a five-story and basement factory building 60 x 150 ft., reinforced concrete construction.

The Burrill Rapids Woolen Mills, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 to engage in the manufacture of woolen goods. A plant will be built for the purpose.

The Town Council of Walkerville, Ont., has completed plans for the erection of an incinerator for garbage disposal, steel construction, to have a daily capacity of 12 tons.

The Grimsby Electric Car Company, Grimsby, Ont., Thomas J. Bailey, manager, is having plans prepared for a new factory building to cost \$40,000, upon which work will be commenced at once.

## Western Canada

WINNIPEG, MAN., April 19, 1913.

The industrial situation continues to improve, and there is hardly a doubt that a great deal of activity will prevail in that connection in the summer. The local machinery houses report a larger demand for different supplies than previously. A large number of cities and towns throughout western Canada will install additional waterworks machinery this year. Some of the new towns that have sprung into existence in the last few years will put in waterworks for the first time before the close of 1913. The lumber mills of the Pacific coast are good buyers of mill machinery.

The Cleveland Mfg. Company, Ltd., has signed an agreement with the authorities of Weyburn, Sask., to build a plant for manufacturing stoves and furnaces.

Davidson & Smith, grain dealers, Fort William and Port Arthur, western Ontario, will erect a large grain elevator at the Pacific coast this year.

The Canadian Government has practically decided to build several big internal storage elevators in western Canada. The points at which these will be erected have not yet been decided upon.

The Canadian Northern Railway Company will still further increase the capacity of its elevator at Port Arthur.

The Dominion Canning Company, Ltd., has practically decided to erect a modern packing plant at Summerland, B. C.

The Okanagan Valley Clay Works will build a large plant at Armstrong, B. C., this year.

Dawson & McEwan, grain dealers, Melfort, Sask., will build a grain elevator at Raleigh, Sask.

Nelson & Armstrong, 1398 Erin street, Winnipeg, are having plans prepared for a sash and door factory here.

The Anthes Foundry Company, Toronto, Ont., wants five acres of land at Calgary, Alberta, on which to build a foundry.

A nickel-plating, stamping and paper-cutter manufacturing works will begin operations some time this month in a factory at Steveston, Lulu Island. Machinery is already being installed. Samuel Cory, a local man, is at the head of the company.

Fire wiped out the planing mills of the Edgewood Lumber Company's plant at Castlegar, B. C., with a loss of about \$14,000. Already a temporary planer and engine have been taken to Castlegar and are being worked in connection with the mill. As soon as the necessary arrangements can be made a new planer will be built.

Cushing Bros. & Co. have commenced work upon an addition to their large planing mill and wood-turning factory at Saskatoon, Sask. The addition will be 90 x 110 ft., two stories and basement. The building will be of brick and will cost about \$18,000 or \$20,000.

The Maritime Nail Company, St. John, N. B., will erect a plant for the manufacture of wire and wire nails on Island No. 1, Fort William, Ont. The cost of this plant will be in the neighborhood of \$500,000.

Robert McNair is planning to erect a shingle mill on the waterfront at Port Moody, B. C.

## Government Purchases

WASHINGTON, D. C., April 21, 1913.

The Isthmian Canal Commission, Washington, will open bids May 14, under Canal Circular 763, for furnishing and erecting coal-handling machinery and accessories for two coal-handling plants.

The Commissioners of the District of Columbia will open bids May 5 for furnishing and delivering one 125-hp. fuel-oil engine, direct connected to an electric generator.

The office of the Quartermaster, Fort Bayard, N. M., will open bids May 8 for furnishing and installing one 10-hp. engine in the sawmill of the fort.

The Treasury Department, office of the supervising architect, Washington, will open bids May 28 for two high-pressure water-tube boilers for the Bureau of Engraving and Printing.

The Daily Consular Reports, issued by the Bureau of Manufactures, Department of Commerce, Washington, give a number of foreign trade opportunities for machinery and equipment. Detailed information may be obtained from the department. Abstracts of these inquiries are as follows:

No. 10,554.—An American consular officer has had inquiries for machinery for working up by-products of sulphite mills.

No. 10,566.—The Department of Agriculture, Buenos Ayres, Argentina, will receive tenders for one 50-hp. Diesel motor coupled by belting to a three phase alternator, 31 kw, 225 volts; one alternating

current dynamo, 35 amperes, 225 volts; switchboard, cables and six three phase motors.

No. 10,569—An American consul officer reports that a firm in his district desires to be put in touch with manufacturers of machinery for extracting tannic acid from hemlock bark.

No. 10,708—An American consul in the Near East has had inquiries for correspondence with manufacturers of gas motors, automobiles, windmills, etc., with a view to establishing an agency.

No. 10,751—An American consul in an European country has had inquiries for the names of manufacturers of machinery for making bricks. A plant with a capacity of 20,000 bricks a day is contemplated.

No. 10,769—Supplementing a previous report, No. 8912, the American consul at Alexandria, Egypt, reports that the Egyptian Government is now asking for tenders for the supply and erection of one of the pumping stations in connection with a large drainage project.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 8 for materials and supplies for the navy yards as follows:

Schedule 5251, class 36, one cold-bend testing machine—Bidder 23, J. F. Cox & Co., Bayonne, N. J., \$500 and \$750; 105, Manning, Maxwell & Moore, New York, \$375; 132, Riehle Bros. Testing Machine Company, Philadelphia, Pa., \$375; 171, Tinus Olsen Testing Machine Company, Philadelphia, Pa., \$750.

Schedule 5270, class 81, one geared open-back power press, motor-driven—Bidder 14, E. W. Bliss Company, Brooklyn, N. Y., \$1,240 and \$1,280; 85, Kemp Machinery Company, Baltimore, Md., \$756; 105, Manning, Maxwell & Moore, New York, \$1,324 and \$1,340; 113, National Contracting Company, New York, \$1,250; 127, Prentiss Tool & Supply Company, New York, \$1,006.85; 139, Standard Machinery Company, Providence, R. I., \$1,350; 145, D. H. Stoll Company, Buffalo, N. Y., \$950; 154, Toledo Machine Tool Company, Toledo, Ohio, \$706.

Schedule 5271, class 91, one steam drop hammer and one motor-driven trimming press—Bidder 105, Manning, Maxwell & Moore, New York, \$2,526 and \$2,537; 109, Niles-Bentent-Pond Company, New York, \$2,190; 127, Prentiss Tool & Supply Company, New York, \$2,412.50; 139, Standard Machinery Company, Providence, R. I., \$1,225, part.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 15 as follows:

Schedule 5287, class 181, for one set oxy-acetylene equipment—Bidder 26, Davis-Bournonville Company, New York, \$2,600; 49, International Oxygen Company, New York, \$1,792.

## Trade Publications

**Hot Metal Cars.**—Wm. B. Pollock Company, Youngstown, Ohio. Pamphlet. Illustrates a line of hot metal cars for transporting and handling metal at blast furnaces and steel works. The special features of the cars are strength of construction, absence of small wearing parts and simplicity of operation. These cars are built in what are known as the five-trunnion and the short-pour types, and it is claimed for both that reduction of ladle scrap, increased yield and economy of upkeep are obtained. Views of both cars give the different positions from the transit to the pouring one, and a partial list of users is included.

**Recording Instruments.**—Bristol Company, Waterbury, Conn. Two bulletins and a catalogue. The two bulletins, which are Nos. 138 and 139, deal with an electric and mechanical time recorder respectively for continuously recording the time and extent of mechanical movements, machine operations, valve reversals, etc. The catalogue, No. 1200, is devoted to the company's class II recording thermometers for temperatures between 90 and 500 deg. F. In all three descriptions and illustrations of the various apparatus are given, together with reproductions of the different types of charts that can be furnished. An illustrated description of the time recorder appeared in *The Iron Age*, November 30, 1912.

**Spring Steel.**—Patriarche & Bell, 215 Pearl street, New York City. Stock list. Gives the various sizes of round, square and flat spring steel, which this company carries in stock for prompt shipment. Mention is also made of other kinds of steel, such as annealed cutter blanks; tool, rock drill, punch, die and machinery steels; drill rods, sheet steel, spring wire, etc.

**Air Compressors.**—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 3312. Describes the Imperial XB duplex power-driven air compressor which is suitable for mine, tunnel, quarry and contract plants, shop and foundry equipment, air power plants, air lift pumping systems and general industrial applications of compressed air. The compressor is illustrated complete and also in its several parts and a partial table of specifications is included.

**Drills.**—Chicago Pneumatic Tool Company, 1010 Fisher Building, Chicago, Ill. Three bulletins, Nos. 137, 138 and 139. All are concerned with the Chicago Giant rock drill which is of the tappet type, the first describing the drill, while the remaining ones list the mountings and appurtenances respectively which can be furnished. All of these are illustrated and there are also views showing the drill in use. Condensed specification tables are included in all three bulletins.

**Drills.**—Sullivan Machinery Company, Peoples Gas Building, Chicago, Ill. Bulletins Nos. 55A and 66G. The first is a set of advance pages of a catalogue of the diamond core drills and illustrates a few of the types in most common use. One of the drills is a new portable one which is mounted on a steel truck and is driven by a direct-connected gasoline engine. The bulletin deals with hammer drills for mining and construction work and includes stoping, drifting, sinking, block-holing and hitch-cutter types. In both bulletins

not only are the drills themselves shown but engravings illustrating them in actual use are also included.

**Furnaces.**—W. S. Rockwell Company, 50 Church street, New York City. Bulletin No. 17. Treats of a line of stationary type furnaces which are suitable for hardening, annealing, case-hardening, tempering or heat treating any small pieces of regular or irregular shapes and sizes in aluminum, brass, copper, German or sterling silver, steel, etc. These furnaces are built in 36 different sizes and can use either oil or gas as fuel. Illustrations of the furnace built solidly or with legs are given. Line drawings showing the dimensions corresponding to those given in the specification table are also included.

**Reinforced Concrete Railroad Ties.**—Louis Blessing, Jackson, Mich. Circular. Relates to a new type of reinforced concrete railroad tie which can be used for both steam and electric lines. These ties are reinforced by twisted 5/16-in. square bars, the reinforcement lapping between the rails so that there are eight bars in this portion. An illustration of the tie showing the method employed for fastening the rails for both classes of roads is included.

**Bearings.**—A. Allan & Son, 486 Greenwich street, New York City. Folder. Calls attention to the use of the firm's bronzes for use in mill pinion, locomotive and steam, gas and oil engine bearings. The special advantages resulting from the use of this metal for these various purposes is briefly touched upon.

**Flexible Couplings.**—Francke Company, New Brunswick, N. J., Smith-Serrell Co., Inc., 90 West street, New York City, general sales agent. Bulletin No. 18, superseding Nos. 15 and 16, describes a flexible coupling for use with steam and gas engines, steam and hydraulic turbines, motors, pumps, blowers, printing presses, rolling mill machinery, etc. This coupling is of the ordinary flange type, the parts being connected by flexible pins of tempered steel leaves and is made for use in connection with shafts ranging in diameter from  $\frac{1}{4}$  in. upward. Special large couplings can be built to order. An illustrated description of the coupling appeared in *The Iron Age*, March 6, 1913.

**Automatic Motor Controllers and Starters.**—Cutler-Hammer Mfg. Co., Milwaukee, Wis. Eight bulletins. Nos. 6090, 6095, 6100 and 6105 describe types of automatic starters for direct-current motors which are used in place of hand starters where it is desired to get the proper acceleration, regardless of the carelessness of the workman and when convenience of control is an essential factor. These starters can be placed out of the way, and the motor started by merely pushing a button or closing a small switch. Bulletins Nos. 9630, 9632, 9640 and 9642 illustrate and describe a new line of automatic controllers for use with slip ring polyphase motors, operating on low and high voltage circuits. New types of magnetic switches are used on these controllers, the construction and functions of which are fully described.

**Boiler Tube Cleaner.**—Lagonda Mfg. Company, Springfield, Ohio. Bulletin W. Points out how scale deposits form quickly in the tubes used for supporting the firebox arches in locomotive boilers, due to the fact that the tubes are subjected to very high temperatures and the rapid rate of water evaporation and causes damage. A special type of tube cleaner in which the body or turbine part is very short and the cutting head is connected to it by a toggle joint is described. This cleaner is equipped with the company's Weinland quick repair head, which was illustrated in *The Iron Age*, March 17, 1910.

**Shearing Machinery.**—Thomas Carlin's Sons Company, Pittsburgh, Pa. Wall hanger. Illustrates a line of shearing machinery for cutting square steel stock ranging from  $1\frac{1}{4}$  to 6 in. on the side. All of the machines with the exception of the smallest size are arranged to be mounted directly on the floor with a pit for the flywheel and driving pulley.

**Emery Wheel Tapers.**—Pittsburgh Emery Wheel Company, 603 Park Building, Pittsburgh, Pa. Pamphlet. Contains a reprint of a letter from Charles G. Smith, the company's president, which was printed in *The Iron Age*, March 6, 1913, on the subject of "Standard Tapers for the Sides of Safety Shape Emery Wheels." This recommends a uniform taper of  $\frac{1}{4}$  in. to the foot, with a  $6\frac{1}{2}$ -in. flat spot for the wheel and a 4-in. flat spot for the collars. A list of the collar equipment recommended for various wheel diameters is also included.

**Ball Bearing, Polishing and Buffing Machinery.**—Webster & Perks Tool Co., Springfield, Ohio. Pamphlet. Deals with a line of ball bearing polishing and buffing machines. After a brief foreword regarding the adoption of ball bearings, the various machines are illustrated and condensed tables of specifications are given. The various types of spindles furnished with the largest machines are illustrated, and there is a sectional view showing the head construction of the smallest machine.

**Portable Reaming Machines.**—Hisey-Wolf Machine Company, Cincinnati, Ohio. Bulletin No. 901. Relates to a line of portable direct-current electric reaming machines which are built with either the center or off-center drive. The machines are designed for use on 110 or 220 volt circuits and will handle reamers having diameters up to  $\frac{1}{2}$ ,  $\frac{3}{4}$  and  $1\frac{1}{16}$  in. respectively, the speeds being 400, 215 and 200 r. p. m. Illustrations of the different machines are included, together with a composite sectional view and views of the bearing and the reamer socket.

